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STUDIES IN ARTOCARPUS AND ALLIED GENERA, IV. A REVISION OF ARTOCARPUS SUBGENUS PSEUDOJACA *

FRANCES M. JARRETT

38. **Artocarpus lakoocha** Roxb. Fl. Ind. 3: 524. 1832, *"Lakoocha"*; Graham, Cat. Bombay Pl. 193. 1839; Wight, Ic. Ind. Or. 2: *t. 681.* 1843; Tréc. Ann. Sci. Nat. Bot. III. 8: 117. 1847; Dalz. & Gibson, Bombay Fl. 244. 1861; Brandis, For. Fl. N.-W. & C. Ind. 426. 1874, pro max. parte; Kurz, For. Fl. Burma 2: 433. 1877; King in Hook f. Fl. Brit. Ind. 5: 543. 1888, pro parte; King, Ann. Bot. Gard. Calcutta 2: 14. 1889, p.p., quoad *t. 13*, excl. spec. *Griffith 4666*, *Maingay 1479*; Renner, Bot. Jahrb. 39: 370. 1907; Kanjilal, For. Fl. Siwalik & Jaunsar, 379. 1911; Duthie, Fl. Upper Gang. Plain 3: 141. 1915; Troup, Silvicult. Ind. Trees 3: 883. *fig. 326.* 1921; Parkinson, For. Fl. Andaman Is. 253. 1923; Haines, Bot. Bihar & Orissa 5: 824. 1924; Parker, For. Fl. Punjab ed. 2. 487. 1924; Osmaston, For. Fl. Kumaon, 504. 1927; Fischer in Gamble, Fl. Madras 3: 1369. 1928, p.p., quoad spec. *Gamble* et *Lushington*; Parker & Singh, Common Indian Trees, 26. *t. 20.* 1933; Kanjilal et al. Fl. Assam 4: 268. 1940; Benthall, Trees Calcutta, 401. 1946. Holotype(?), Bengal, *Roxburgh s.n.*, Sept. 1812 (BM).

Artocarpus lacucha Roxb. Hort. Beng. 66. 1814, nomen nudum.
Artocarpus bengalensis Roxb. ex Wall. Cat. no. 4655C. 1831, nomen nudum.
Artocarpus reticulata Heyne ex Wall. Cat. no. 4655D. 1831, nomen nudum.
Artocarpus mollis Wall. Cat. no. 4661. 1831, nomen nudum.
Artocarpus yunnanensis H. H. Hu, Bull. Fan Inst. Biol. Peking Bot. 8: 32. 1937. Holotype, Yunnan, *Wang 77078* (PE, not seen); isotype (A).
Artocarpus ficifolia W. T. Wang, Acta Phytotax. Sin. 6: 274. *t. 15*, *fig. 23.* 1957. Holotype, Yunnan, *Exped. Biol. Sino-ross. ad prov. Yunnan 676* (PE ?, not seen); isotype (A).

Deciduous trees, height to 20 m., bark rough, grey or brown. *Twigs* 3–6 mm. thick, shallowly rugose, densely pubescent, hairs yellow to rufous, patent or subappressed, straight. *Leaves* 13–37 × 6–21 cm., elliptic, oblong or ovate, short-acuminate, base broadly cuneate, rounded or

* Continued from volume XLI, p. 109.

subcordate, often oblique, margin entire or denticulate towards the apex; juvenile leaves shallowly pinnatifid; main veins and reticulum prominent beneath, the areolae often slightly bullate; glabrous or nearly so above, venation beneath pubescent, hairs colourless to pale rufous, undulate; lateral veins 9–18 pairs, straight or curved; intercostals parallel; green, drying greyish, greenish or pale brown, venation straw-coloured, smallest meshes of reticulum nigrescent; petiole (10–)15–45 mm. long.

Inflorescences solitary in leaf-axils. *At anthesis: male head* 12–25 × (7–)10–18 mm., ellipsoid, obovoid or clavate; perianths of 2(or 3) free segments, 0.5 mm. long; stamen 0.9 mm. long, filament tapering above, anther-cells ellipsoid, 0.15 mm. long; bracts rather stoutly stalked, heads peltate, to 0.5 mm. across, these and perianths ciliate; peduncle 2–5 × 2 mm., short-pubescent; *female head* with styles exserted to 1–1.5 mm. through low papillae emerging between peltate bracts. *Syncarp* to 6 cm. across (to 12 cm. fide *Winit 301*), subglobose, shallowly lobed, yellow, drying brown, the surface irregularly papillate, pubescent, with numerous persistent bracts; walls c. 3 mm. thick; proximal region of perianths free, fruiting perianths several, fleshy, "seeds" (pericarps with a thin, horny endocarp) ellipsoid, 10 × 6 mm.; core c. 10 mm. across; peduncle 8–15(–25) × 4 mm., short-pubescent.

VERNACULAR NAMES: *lakuch* (Sanskrit), *barhal* (Hindi), *dahu* or *dheu* (Bengali), India; *myauklok*, Burma; *hat lom*, *hat non* (Lao), Siam. USES: the tree is often planted, especially in northern India, for its edible fruit.

DISTRIBUTION: in evergreen, semi-evergreen and moist deciduous forest to 6000 ft., in areas with a distinct dry season; eastern and northern India (Madras, Orissa and Bihar to Assam and Chittagong, and westward along the sub-Himalayan tract to East Punjab), Burma, Andaman Islands, Siam, Indochina, Yunnan; cultivated through much of its range and south to Bombay in India, sparingly introduced elsewhere in the tropics.

India. Not localized: "East India," *Roxburgh* (K, ♀); Himalaya, Tikoli Valley, *Edgeworth 216* (K, ♂); Nouholly, *Hooker f. & Thomson*, Dec. 1850 (K, L, U, P); Punkabarry, *Gamble 1179A* (K, ♂); Tenga Ghats, *sine nom. 1204* (K). EAST PUNJAB. Kangra, Bhadwar, *Koelz 4367* (A, ♂). HIMACHAL PRADESH. Lower Kanaor [= Kunawara], *Royle* (GH, P, ♀). UTTAR PRADESH. Kumaon: above Kota, *Strachey & Winterbottom* (GH, K); Outer Hills, *Strachey & Winterbottom 18* (GH, K, ♂). MADRAS. Ganjam District, Khalingia Ghat, *Gamble 13699* (K); Vizagapatam, Rangalu Shola, *Lushington*, June 1914 (K, ♀). BIHAR. Hazaribagh, *Meebold 3873* (K, ♂, ♀); Singbhum, Karampoda forest, *Haines 636* (K, ♀). ORISSA. Nilghiris, *Pierre 6* (P). Sikkim: *Hooker f.* (K, ♀); below Kasseong, *Hooker f.*, Apr. 1850 (K, ♂); Rangit River, *Clarke 27255* (K), *King*, July 1876 (K, ♀). BENGAL. *Roxburgh*, Sept. 1812 (BM, ♀), *Voigt* (C, ♂), *sine nom. et num.*, Dec. 1837 (L); Siligoree, *Clarke 11615B* (BM, ♀). ASSAM. Cachar, Luckhipoor, *Clarke 7018* (A); Haflong Hill, *Blatter 29156* (K, ♀); Khasia Hills, *Hooker f. & Thomson* (C); Naga Hills, *Prain*, 1886 (CGE); Naga Hills, Lang,

Meebold 7156 (K, ♂). MANIPUR. On the way to Chamoo [? = Tamu], *Watt 5167* (CAL). CHITTAGONG. Hill Tracts, *King 340* (SING, ♀), *417* (L, SING, ♂), *s.n.*, 1882 (L); Khana, *Hooker f. & Thomson* (K).

Burma. Diamond Island, *Prain*, 30 Nov. 1889 (CAL); Myaungmya, Labwuta, *Lace 2977* (K, ♀); Phanac, fl. Saluan [? = Salween River], *Wallich 4661* (CGE, K, P, ♂, ♀); Rangoon *Buchanan Hamilton* (BM), *Dickason 6947* (A, ♂); Rangoon, Kamayut, *Dickason 8256* (A, ♂, ♀); Sandoway, near Taungup, *Lace 2930* (K, ♂). TENASSERIM. Amherst: Moulmein, *Falconer 991* (L). Mergui: *Griffith 1053* (K, ♀). **Andaman Islands.** Ali Masfid Reserve, *Parkinson 385* (K, ♀); Baradang, *Parkinson 205* (DD, ♂); Boru-Lung-Da, *Parkinson 928* (DD, ♀). **Siam.** Dan Sai, Kao Keo Kang, *Kerr 5804* (BM, ♂); Me Kok, Muang Fang, *Kerr 5158* (BM, ♂); Me Lee, Lampoon, *Winit 301, 302* (BM, ♂). PENINSULAR SIAM. Trang, Chawng, *Buncoed 20* (CGE).

Indochina. LAOS. Pac Bac, near Luang Prabang, *Poilane 20478* (P, ♀); between Phinh Ha and Lao Phu Tai, *Poilane 25926* (P, ♂); Vientiane, *Poilane 20782* (P, ♀). TONKIN. Lao Kay prov., between Nam Long and Phouy Tho, *Poilane 25496* (P, ♂). **China.** YUNNAN. *Anderson*, 1875 (CAL), *Forrest 12252* (K, ♂); Chen-Kang Hsien, *Wang 72645* (A, ♂); Chin-ping, Meng-la, *Exped. Biol. Sino-ross. 676*, Apr. 1956 (A, ♂); Fo-Hai, *Wang 74902* (A, ♀), *77078*, June 1936 (A, ♀); Lan-Tsang Hsien, *Wang 76647*(A, ♀); Mienning, Nanya, *Yu 18102* (A, ♂); Shunning, Hila, *Yu 16805* (A, ♀); Szemao, *Henry 11746* (A, K, ♂, ♀).

The distribution of *Artocarpus lakoocha* has generally been given as India, Ceylon, Burma and Malaya, but three corrections to this must be made. Firstly, it was shown by Corner in 1939 (Gard. Bull. Singapore 10: 282) that the entity hitherto identified in Malaya as *A. lakoocha* in fact represented *A. dadah*, a species of western Malaysia. As already noted, the misidentification originated in King's description of this taxon as *A. lakoocha* var. *malayana*, which he did not distinguish satisfactorily from the type. His account of the latter is a mixture of the two species, but the plate was based on Roxburgh's original drawing of *A. lakoocha* (as was the plate in Wight's "Icones"). No collections of this species have been seen from farther south than peninsular Burma and Siam.

Secondly, it has been found that in India, also, two different taxa have been confused under the name *Artocarpus lakoocha*. This species appears to occur as an indigenous tree only in northern India and along the Eastern Ghats, although it is planted more widely. Several collections have been seen from the Bombay area, but none, apparently, is from a wild tree. This is supported by a statement by Graham in 1839 (the sole information traced in the literature) to the effect that *A. lakoocha* was only found in a cultivated state in Salsette and the North Concan. On the Western Ghats and in Ceylon there occurs another entity which has usually been identified as *A. lakoocha*. However, it has been found that it is quite distinct and it is described above as *A. gomezianus* ssp. *zeylanicus*, the differentiating characters being given there. *Artocarpus lakoocha* was described from Bengal and the type and drawing leave no doubt as to the application of Roxburgh's name. The references in which the two entities have been confused are indicated above as far as possible;

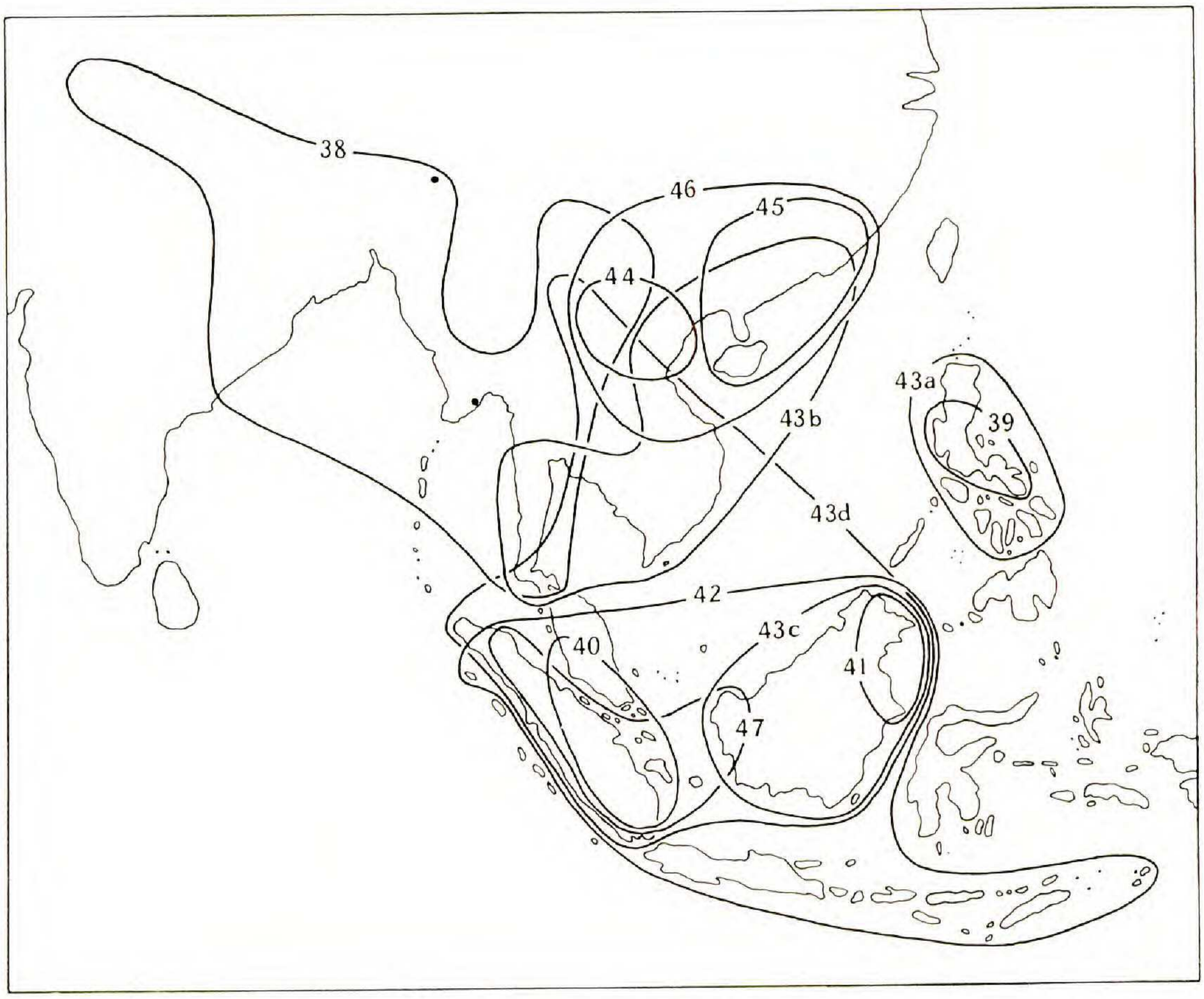

FIG. 19. Distribution of some species of subg. PSEUDOJACA. 38, *Artocarpus lakoocha*; 39, *A. rubrovenius*; 40, *A. fulvicortex*; 41, *A. tomentosulus*; 42, *A. glaucus*; 43, *A. nitidus*, a, ssp. *nitidus*, b, ssp. *lingnanensis*, c, ssp. *humilis* and ssp. *borneensis*, d, ssp. *griffithii*, dots, records not identified to subspecies; 44, *A. petelotii*; 45, *A. hypargyreus*; 46, *A. styracifolius*; 47, *A. altissimus*.

only those which were based primarily on *A. gomezianus* ssp. *zeylanicus* are cited under the latter.

Finally, the area of *Artocarpus lakoocha* must be extended eastward through Siam to Indochina, and to Yunnan from which it has been described twice without reference to Roxburgh. Most of the Indochinese collections were made after Gagnepain wrote up the Moraceae for the "Flore Générale de L'Indochine" (1928), and he did not mention *A. lakoocha*. The distinctions between this species and *A. tonkinensis* are given above, under the latter entity.

39. **Artocarpus rubrovenius** Warb. in Perkins, Frag. Fl. Philip. 166. 1905, "*rubrovenia*"; Merr. Philip. Jour. Sci. 1, Suppl. 43, 1906, Enum. Philip. Pl. 2: 43. 1923; Elmer, Leafl. Philip. Bot. 2: 622. 1909; Brown, Useful Pl. Philip. 1: 470. 1941. Holotype, Luzon, *Warburg 12949* (B).

Trees, height to 15 m., bark mottled grey and brown. *Twigs* 2.5–5 mm. thick, appressed-puberulent, soon glabrescent. *Leaves* 11–26 × 5–14 cm., ovate to elliptic, with an acumen to 2.5 cm. long, base broadly rounded

to broadly cuneate, often oblique, glabrous, margin entire; main veins prominent beneath, intercostals slightly so; lateral veins 8–13 pairs, curved; intercostals parallel; green with yellowish-white main veins, drying brown or blue-grey above, paler brown beneath, venation reddish or nigrescent in young leaf, straw-coloured when mature; petiole 15–30 mm. long.

Inflorescences solitary or paired in leaf-axils. *At anthesis: male head* 15–45 × 10–20 mm., obovoid to clavate; perianths of 2–4 segments, free or fused at the base, 0.5 mm. long; stamen 0.7 mm. long, filament cylindric, abruptly contracted above, anther-cells ellipsoid, 0.2 mm. long; bracts stoutly stalked, heads peltate, to 0.3 mm. across, these and perianths pubescent; peduncle 1.5–3 × 1.5 mm., velutinous; *female head* with styles exserted to 0.5–0.8 mm. through papillae emerging between peltate bracts. *Syncarp* (submature) to 3 cm. across, subglobose or shallowly lobed, drying brown or cinereous, the surface nearly smooth, short-pubescent, with numerous persistent bracts; proximal region of perianths free; peduncle 5–10 × 3 mm., velutinous.

DISTRIBUTION: in forest to 1200 ft., Luzon (? also in Mindoro).

Philippine Islands. LUZON. *Haencke 433* (NY, ♀). Quezon (Tayabas): Baler, *Merrill 1034* (K, US, ♀), *Quisumbing PNH 2511* (A, PNH, SING, ♀); Casiguran, *Ramos & Edano BS 45226* (BO, NY, ♂); Lagumanoc, *Merrill 2590* (K, US, ♂); Lucban, *Elmer 9128* (A, BO, K, L, ♂), *McGregor BS 47395* (NY, ♀); Sampolor, *Warburg 12949*, Mar. 1888 (B, ♂, ♀). Bataan: *Curran 5439* (US); Lamao River, Mt. Mariveles, *Borden FB 2562* (BO, K, SING, ♀), *2915* (NY, US, ♂), *2498* (BO, K, P, SING, ♂). Pampanga: Camp Stotsenburg, Mt. Pinatubo, *Elmer 22030* (BM, GH, L, ♂, ♀). Rizal: *Ahern FB 3197* (BO, K, SING, US, ♀); Morong district, *Vidal 3832* (K, US, ♀); San Mateo, *Vidal 1548* (A, K, L, ♂). Batangas: *Ramos & Deroy BS 22656* (A, BM, GH, K, L, P, SING, ♂). Camarines: *Alvarez FB 21440* (BM, BO, K, P, ♂, ♀), *Ramos 1517* (BM, BO, GH, L, P, SING, ♂, ♀). Albay: Banao, Guinabatan, *Mendoza PNH 18505* (L, PNH, ♀). Sorsogon: *Curran FB 10524* (K, SING, ♀), *Vidal 3839* (K, ♂); Irosin, *Vidal 3836* (K, ♀); Irosin, Mt. Bulusan, *Elmer 15598* (A, BM, K, L, ♂, ♀), *Sulit PNH 2753* (A, BO, PNH, SING, ♀).

Although, as was pointed out in the discussion of section *Pseudojaca*, *Artocarpus rubrovenius* shows a relationship with *A. lakoocha*, it is readily distinguished by the glabrous leaves lacking a prominent reticulum, and, at anthesis, by the shorter styles. The differences from the other glabrous-leaved members of subgenus *Pseudojaca* that occur in the Philippines, *A. xanthocarpus* and *A. nitidus* ssp. *nitidus*, are given under the latter entity.

Merrill stated in 1923 that *Artocarpus rubrovenius* occurred on Mindoro and Cagayan Sulu, in addition to Luzon. The former record may be based on the two collections cited by Merrill that have not been seen, *Darling FB 14704* and *Merrill 1517*. It is presumed, from the identification on the herbarium sheet, that the latter is based on *Merrill 5304*, although the number was not cited. This collection is here referred to *A. gomezianus* ssp. *gomezianus*.

40. **Artocarpus fulvicortex** Jarrett, sp. nov.

Artocarpus sp., Corner, Wayside Trees, 658, *t. 197*. 1940.

Ramuli juniores puberulentes; folia late elliptica vel subrotunda, nervis lateralibus utrinque 6–10, nervis transversalibus paucis, costa nervis lateralibus venulisque subtus valde prominentibus, pubescentibus, intervenio saepe minute pubescenti; inflorescentiae subsessiles; capitula mascula subglobosa, 4–6 mm. diametro; syncarpia globosa, superficie plana, pubescentia, bracteis persistentibus.

Arbores [ad 35 m. altae], deciduae, cortice nova fulva vel rufi-brunnea. *Ramuli juniores* 4–8 mm. crassi, subrugosi, puberulentes, cortice in sicco mox squamis decidua; [ramuli juveniles pubescentes]. *Folia* c. 15 × 10 [10–20 × 7–14] cm., late elliptica vel subrotunda, obtusa vel breviter acuminata, basi cuneata [vel rotunda], integra, supra subglabra, costa nervis lateralibusque pubescentibus exceptis, subtus costa nervis lateralibus venulisque valde prominentibus, pubescentibus, pilis rufis, interdum sparsis, intervenio minute pubescenti vel puberulenti, [foliis juvenilibus subglabro], supra saturata viridia, subtus subglauca, in sicco utrinque rufi-brunnea vel caesia; nervi laterales utrinque 7 [6–10], curvati; nervi transversales pauci, paralleli vel reticulati; petiolus 20 [15–25] mm. longus.

Inflorescentiae axillis foliorum solitariae vel geminae. *Ad anthesin: capitula mascula* 4–7 × 4–6 mm., globosa vel obovoidea; perianthia profunde bifida, 0.7 mm. longa, breviter ciliata; stamina 0.8 mm. longa, filamentis supra attenuatis, cellis antherum ellipsoideis, 0.15 mm. longis; bracteae crasse stipitatae, capitibus peltatis, ad 0.5 mm. latis, breviter ciliatis; pedunculus 0.5–1.5 × 1 mm., breviter pubescens; *capitula feminea* stylis inter bracteas peltatas crebras 0.5 mm. exsertis. [*Syncarpia* ad 5 cm. diametro, globosa, fulva, carne lutea, in sicco rufi-brunnea, superficie plana, pubescenti, bracteis numerosis persistentibus, inconspicuis, in indumento immersis; stratum externum syncarpii c. 5 mm. crassum; "semina" (endocarpia cornea) plura, obovoidea, 10 × 5 mm., perianthiis omnino conjunctis inclusa; axis syncarpii c. 15 mm. diametro; pedunculus 4 × 4 mm., breviter pubescens.] (Inflorescentiae typi anthesin atque syncarpium maturum (*Corner SFN 34663*) ab eadem arbore collectum omnes spiritu vini conservae descriptae.)

HOLOTYPE: Malaya, *Corner SFN 33686* (SING).

DISTRIBUTION: in lowland evergreen forest to 250 ft.; Malaya, Sumatra, Banka.

Malaya. PERAK. Batu Gajah, *Corner*, Aug. 1936 (SING); Slim River, *Corner*, Aug. 1937 (SING). PAHANG. Kemansul For. Res., *Symington KEP 49822* (KEP). NEGRI SEMBILAN. Seremban, *Walton KEP 63363* (KEP, ♀). MALACCA. *Maingay 1485* (K). SINGAPORE. *Cantley* (SING); Cluny Road, *Ridley 4829* (BM, CAL, SING, ♀); Chanchu Kang, *Ridley 4129* (K, SING, ♂, ♀); Krangi, *Goodenough 3379* (CAL, SING); ne. end of MacRitchie Reservoir, *Sinclair SFN 38916* (SING, L, ♂); Reservoir Jungle, *Corner*, Jan. 1937 (SING). **Sumatra.** PALEMBANG. Ban-

juasin, Bentajan, *NIFS T 1030* (BO); Lematang Ilir, Gunong Megang, *NIFS T 364* (BO, L, ♂), *592* (BO, L, U, ♂, ♀). LAMPONGS. Kotabumi, *bb 35005* (BO); Tulang Bawang Ilir, Bandjar Agung, *bb 8951* (BO). BANKA. Blinju, *Grashoff 20* (BO, L); Koba, *Teysmann HB 7242* (BO, C, CAL, K, L); Muntok, Batu Balai, *Teysmann HB 6843* (BO, CAL, K, L, P). **Cultivated.** MALAYA. Singapore, Hort. Bot. (all from tree in potting yard), *Corner SFN 33686*, Sept. 1937 (SING, ♂, ♀), *34501*, *34663* (SING, ♀), *Merah SFN 33549* (SING).

This species was described as *Artocarpus* sp., "Orange-barked *Tampang*," in 1940 by Corner, who stated (p. 650) that the bark colour was distinctive, since it was grey or brown in other Malayan species of the genus. The broadly elliptic or subrotund leaves, with few lateral veins and a markedly prominent reticulum on the lower surface, have a characteristic appearance which enables this species to be identified readily when sterile. However, no previous description under a scientific name has been found, and specimens have been identified as either *A. lakoocha* or *A. dadah*. *Artocarpus fulvicortex* differs from the latter in the leaf characters given above, and also in the very short peduncles of the inflorescences, the numerous bracts persisting on the syncarp and the nearly glabrous young twigs.

41. **Artocarpus tomentosulus** Jarrett, sp. nov.

Differt ab *A. fulvicortice* foliis ellipticis, elliptici- vel ovati-oblongis, nervis lateralibus utrinque 10–14, nervis transversalibus plurimis, syncarpio pedunculo 25 mm. longo.

Arbores ad 20 m. altae. *Ramuli juniores* 2.5–4.5 mm. crassi, rugosi, puberulentes. *Folia* c. 18 × 10 [11–23 × 6–12] cm. elliptica ad elliptici- vel ovati-oblonga, acuminata [acumine ad 2 cm. longo], basi rotunda [vel late cuneata], integra, supra glabra, costa nervis lateralibusque pubescentibus exceptis, subtus costa nervis lateralibus venulisque prominentibus, pubescentibus, intervenio minute tomentoso [vel glabro], in sicco supra pallidi- vel rufi-brunnea, subtus pallidi-brunnea; nervi laterales utrinque c. 12 [10–14], curvati; nervi transversales plurimi, paralleli; petiolus 15[–45] mm. longus.

Inflorescentiae axillis foliorum solitariae. [*Capitula mascula* (immatura) ad 7 mm. diametro, globosa; perianthia tubulosa, 0.6 mm. longa, supra bilobata, minute pubescentia; stamina (nondum exserta) cellis antherum ellipsoideis, 0.15 mm. longis; bracteae tenuiter stipitatae, capitibus peltatis, ad 0.4 mm. latis, minute pubescentibus; pedunculus c. 2 × 2 mm., brevissime pubescens.] *Syncarpium* (submaturum) 3 cm. diametro, subglobosum, fulvum, in sicco brunneum, superficie parum papillosa, pubescenti, bracteis peltatis plurimis persistentibus; pedunculus 25 × 3.5 mm., breviter pubescens.

HOLOTYPE: British North Borneo, *Keith 7671* (SING).

DISTRIBUTION: in forest to 2000 ft.; endemic to northeastern Borneo.

Borneo. EAST AND NORTHEAST BORNEO. Berouw: *bb 18909* (A); Bekmuari, *bb 19133* (A, BO, L). Bulungan: Mara, *bb 10806* (BO). BRITISH NORTH BORNEO. Kabili-Sepilok For. Res., *Keith 7671*, Sept. 1937 (SING, ♀); Kalabakan, 30 miles wnw. of Tawau, *Wood SAN A 3684* (A, KEP, L, SING, ♂).

The material of *Artocarpus tomentosulus* is very limited, but the collections are well characterized by the leaves, which have fairly closely set, spreading lateral veins with numerous parallel, rather slender intercostals. The type, *Keith 7671*, bears a submature syncarp, and this specimen and *bb 10806*, which is sterile, have the intervenium minutely tomentose. The remaining collections, *Wood SAN A 3684* (with male inflorescences), *bb 18909* and *bb 19133* (sterile), have a glabrous intervenium. It is possible that the latter are taken from juvenile shoots, since the leaves are somewhat larger than in the previous collections. If these three collections are matched with the other two on the basis of the venation, as seems justifiable, the characters of this species correspond with those of *A. fulvicortex* in the small, subsessile, more or less globose male heads, and in the combination of prominent, patent-pubescent venation on the lower surface of the leaf with a frequently minutely tomentose intervenium, although the syncarp peduncle is considerably longer (25 mm. instead of 4 mm.). These leaf characters are unique in the subgenus; in other species with a tomentose intervenium (*A. glaucus*, *A. hypargyreus* and *A. styracifolius*) the venation is less prominent, and the main veins, at least, are subglabrous. Collections of *A. dadah* from Borneo (which can be distinguished by the narrower leaves and the pubescent twigs) may also appear to have hairs on the intervenium of the leaf, but these are nearly all inserted along the edge of the veins of the reticulum and appressed over the areolae.

42. **Artocarpus glaucus** Blume, Bijdr. 483. 1825, "*glauca*"; Tréc. Ann. Sci. Nat. Bot. III. 8: 121. 1847; Miq. in Zoll. Syst. Verz. Ind. Archip. 2: 90, 96. 1854; Miq. Pl. Jungh. 293. 1854, Fl. Ind. Bat. 1(2): 288. 1859, Ann. Mus. Lugd.-Bat. 3: 212. 1867; Koord. & Val. Bijdr. Boomsoort. Java 11: 26. 1906; Backer, Beknopte Fl. Java 6: 16. 1948. Neotype, Java, *Zollinger 704* (P).

Artocarpus glaucescens Tréc. Ann. Sci. Nat. Bot. III. 8: 120. 1847; Miq. in Zoll. Syst. Verz. Ind. Archip. 2: 90. 1854; Miq. Fl. Ind. Bat. 1(2): 288. 1859, Ann. Mus. Lugd.-Bat. 3: 212. 1867; Renner, Bot. Jahrb. 39: 369. 1907. Holotype, Java, *Zollinger 704* (P); isotypes (BM, GH, K, L, P).

Artocarpus zollingeriana Miq. in Zoll. Syst. Verz. Ind. Archip. 2: 90, 95, 1854; Miq. Fl. Ind. Bat. 1(2): 289. 1859. Syntypes, Java, *Zollinger 512* (P), Bogor, Hort. Bot., *Zollinger s.n.* (U); lectotype, *Zollinger 512* (P).

Artocarpus biformis Miq. Fl. Ind. Bat. Suppl. 419. 1861. Holotype, Sumatra, *Teysmann HB 4444* (U); isotypes (BO, L).

Artocarpus tephrophylla Miq. Fl. Ind. Bat. Suppl. 422. 1861. Holotype, Sumatra, *Teysmann 4504* (U); isotypes (BO, L).

Artocarpus inaequalis Teysm. & Binnend. Cat. Hort. Bog. 382. 1866, nomen nudum.

Artocarpus glaucescens Tréc. var. *tephrophylla* Miq. Ann. Mus. Lugd.-Bat. 3: 212. 1867.

Artocarpus denisoniana King in Hook. f. Fl. Brit. Ind. 5: 544. 1888; King, Ann. Bot. Gard. Calcutta 2: 14. *t. 8B*. 1889; Ridley, Fl. Malay Penin. 3: 355. 1924. Syntypes, Malaya, *King 10318, 10843, 10987* (CAL, not seen; duplicates examined, K, etc.).

Artocarpus glaucus Blume var. *villosiusculus* Warb. ex Renner, Bot. Jahrb. 39: 369. 1907, nomen nudum.

Evergreen trees, height to 40 m., buttressed or not, bark dark grey, peeling. *Twigs* 1.5–4 mm. thick, finely rugose, appressed-puberulent, soon glabrescent. *Leaves* 4–33 × 2–16 cm., elliptic to elliptic-oblong, varying to oblong, obovate, ovate, or ovate-lanceolate, small leaves often rather narrow, acuminate or attenuate, base cuneate, varying to rounded, often slightly unequal and decurrent, margin entire; juvenile leaves lobed; main veins prominent beneath, intercostals slightly so; glabrous above, venation appressed-puberulent beneath, glabrescent, intervenium minutely tomentose (juvenile leaves subglabrous to short-pubescent beneath); lateral veins 8–15 pairs, curved; intercostals parallel; old leaves becoming bullate above between venation; glossy dark green above, light green to dull grey beneath, drying yellowish to bluish grey above, greyish glaucous beneath from the tomentum, young leaves brown with nigrescent main veins; petiole 7–25(–45) mm. long.

Inflorescences solitary or paired in leaf-axils. *At anthesis: male head* 11–24 × 5–6 mm., narrowly oblong or clavate; perianths 2- or 3-lobed, divided nearly to the base, 0.6 mm. long; stamen 0.8 mm. long, filament cylindric, contracted above, anther-cells ellipsoid, 0.2 mm. long; bracts slenderly stalked, heads peltate, to 0.4 mm. across, these and perianths short-ciliate; peduncle 1–3 × 1 mm., velutinous; *female head* with styles exserted to 0.3 mm. through a dense covering of peltate bracts, later through papillae emerging between bracts. *Syncarp* to 3 cm. (fide Koorders & Valeton, 1906, to 7 cm.) across, subglobose, often shallowly lobed, yellow to orange-brown with light-orange flesh, drying dark brown to black, the surface papillate or becoming nearly smooth, short-pubescent, with numerous persistent bracts; wall c. 3 mm. thick; proximal region of perianths free, fruiting perianths several, "seeds" (horny pericarps) ellipsoid, 10 × 7 mm.; core c. 10 mm. across; peduncle 2–5 × 2 mm., velutinous.

VERNACULAR NAME: *tiwu landu* (Sundanese), Java.

DISTRIBUTION: in evergreen forest to 2500 ft., Malaya, Sumatra, Simalur, Banka, Borneo, Java, Lesser Sunda Islands (Sumba, Roma, Tanimbar Islands).

Malaya. KEDAH. Katumbah, *Meh 17874* (K, SING, ♂). PERAK. Ulu Bubong, *King 10161* (A, SING, ♀), *10318*, June 1886 (BM, K, L, ♂, ♀), *10843*, Aug. 1886 (BM, K, ♀), *10987*, 1886 (K, P, SING, ♂, ♀). PAHANG. Bentong, *Ahmad CF 5052* (K, ♂); 3 miles s. of Kuala Lipis, *Burkill & Haniff SFN 17168* (BO, K, SING, ♂, ♀). SELANGOR. Ulu Gombak, *Murdoch 304* (SING, ♂, ♀). JOHORE.

10½ miles Kota Tinggi-Jemalaung road, *Sinclair SFN 40348* (K, L, SING, ♂, ♀).

Sumatra. TAPANULI. Padang Lawas, Hatiran, *Rahmat si Boeea 4883* (A, K, L, ♀), *4920* (A, K, L, ♂). WEST COAST. Priaman, *Diepenhorst HB 1325* (BO, L, P, U). EAST COAST. Aer Kandis, near Rantau Parapat, Bila, *Rahmat si Boeea 2467* (A, L, SING, ♂, ♀); Sibolangit, *Docters van Leeuwen-Reijnvaan 12711* (BO, K, L, ♂), *Lörzing 5170* (BO, ♂). DJAMBI. Danau Lama, *bb 13643* (BO); Simpang, *bb 13115* (BO). BENKULEN. Kroi, Gunong Nemala, *bb 8758* (BO); Ranaumeer, Talangtotong, between Simpang and Sepatuhu, *Van Steenis 3378* (BO, ♀). PALEMBANG. Lematang Ilir, Gunong Megang, *NIFS T 886, 891* (BO, L, ♀); Musi Ilir, Muara Punojung, *bb 9202* (BO); Musi Ulu, *Endert 159* (BO). LAMPONGS. Kalianda, Gunong Kadjabasu, *De Wit 14* (BO); Kalianda, Ketjapi, *bb 8954* (BO, L); Siring Kebou, *Teysmann HB 4504* (BO, L, U); Tarabangi Ilir, *Teysmann HB 4444* (BO, L, U). SIMALUR. *Achmad 966* (BO, K, L, SING, U, ♂, ♀); Landschap Tapah, Defajan, *Achmad 1405* (BO, L, U, ♂, ♀), *1675* (BO, L, P, ♂), *1721* (BO, L, SING, ♂, ♀). BANKA. S. Banka, Rindik, *bb 11585* (BO).

Borneo. SARAWAK. Sungei Sama, *Daud & Tachun SFN 35729* (SING, ♀). WEST BORNEO. Ketapang, Riamdadap, *bb 8306* (BO); Sambas, Sai, *bb 7086* (BO, L, ♂). SOUTH AND SOUTHEAST BORNEO. Bandjarmasin, *Motley 1279* (CGE, K, ♂, ♀); Muara Tewe, Dusun Ulu, Sungei Pararawen, *Dachlan 2411* (L). BRITISH NORTH BORNEO. *Wood 2159* (BO, ♂, ♀); Beaufort south mile 18, *Wood 2608* (SING, ♂); Tenom, Pangie, *Angian Herb. For. Dept. B.N.B. 10482* (KEP, ♂).

Java. *Hasskarl HB 1869* (L), *De Vriese* (K, L, U), *Zippelius 1332 (HB 7267)* (BO), *Zollinger 512* (P, ♂), *701* (K), *s.n.* (K, L, P, U). WEST JAVA. Bantam: Gunong Kantjana, *Koorders 41644* (BO); Gunong Mung, Gunong Karang, Pulasari, *Koorders 40118* (BO, L); Tapos, *Teysmann HB 7268* (BO); Tjibadui, Kosala, *Forbes 450* (BM, BO, CAL, SING, ♂, ♀); Tjikoja, *Zollinger 704* (BM, GH, K, L, P, ♂), *706* (U); Tjimara-Udjong Kulon, Gunong Marang, *Koorders 8672* (BO, L, P); Tjimara-Udjong Kulon, Gunong Rompang, *Koorders 8671* (A, BO, L, P) *9932* (BO). Buitenzorg: Leeuwiliang, Pasir Honje, *Bakh. van den Brink 6953* (BO, K, L, P, SING, U, ♂); Nangala, *Bakh. van den Brink 7629* (BO, L, ♀); Nangala, Gunong Menteng, *Bakh. van den Brink 7717* (BO, K, L); Nangala, Gunong Tjiputih, *Bakh. van den Brink 7726* (BO, K, L, P, U, ♂, ♀); Nangala, Tjilankop near Tjiputih, *Bakh. van den Brink 7719* (BO); Tjibinong, *NIFS Ja 2702* (BO, ♀). Preanger: Sukabumi, Tjisahong, Tjisalak, *Koorders 39445* (BO, K, L, P, ♀); Njalidung, *Uhl 6555* (BO, ♀). CENTRAL JAVA. Banjumas: Bandjarnegara, Pagedongan, *NIFS Ja 2549* (A, BO); Bandjarnegara, Pringombo, *Koorders 8673* (BO, L), *33881* (BO), *39184* (BO, K, L), *39194* (BO, L, P). Pekalongan: Subah, Pesan, *Koorders 27594* (BO, L, P, ♀). Semarang: Ungaran, Telomojo, *Koorders 39234* (A, BO, K). EAST JAVA. Pasuran: Tangkil Zuidergebergte, *Koorders 23784* (BO).

Lesser Sunda Islands. SUMBA. E. Sumba, Djuli, *bb 15133* (BO). ROMA. Hila, *bb 7219* (BO). TANIMBAR ISLANDS. P. Jamdena, between Kampong Ilgnei and Otimmer, *Buwalda 4131* (K, L, ♂, ♀) = *bb 24224* (A, BO, L, SING, ♀). **Cultivated.** JAVA. Bogor, Hort. Bot., *Teysmann HB 7274* (BO, P, ♀), *s.n.*, 1867 (BM, L, ♀), *Zollinger* (U).

No collections determined as *Artocarpus glaucus* by Blume himself have been found, but the description is clearly identifiable. The glaucous lower surface of the leaf distinguishes this species from any other member of the genus growing in Java, and, with the elongate, subsessile male head,

from the rest of subgenus *Pseudojaca*. The leaves vary considerably, but continuously, in shape from tree to tree, and they also become markedly coriaceous with age. Several specimens bear what appear to be galled shoots. These are short and highly branched, and bear many inflorescences, which are usually male, but are abnormally shaped. The heads are obovoid with peduncles to 5 mm. in length, and the flowers are often malformed.

43. **Artocarpus nitidus** Tréc. Ann. Sci. Nat. Bot. III. **8**: 119. 1847.

Evergreen trees, height to 35 m., buttressed or not, bark red-brown. *Twigs* 1–4 mm. thick, smooth or finely rugose, appressed-puberulent, soon glabrescent. *Leaves* 3.5–23 × 1.5–9 cm., elliptic, obovate- or oblong-elliptic, to obovate- or ovate-oblong, obtuse to attenuate or with an acumen to 2.5 cm. long, base cuneate or rounded, margin entire; main veins prominent beneath, intercostals slightly so; glabrous, or puberulent beneath on the main veins (rarely throughout in ssp. *lingnanensis*); lateral veins 5–15 pairs, straight or curved; intercostals few, usually parallel; dark green above, paler or yellowish green beneath; petiole 5–15(–25) mm. long.

Inflorescences solitary or paired in leaf-axils. *At anthesis: male head* 3.5–12 × 2.5–7 mm., oblong, obovoid or clavate; perianths of 2–4 segments free or fused at the base, 0.5–0.7 mm. long; stamen 0.8–1 mm. long, filament broad, tapering or contracted above, anther-cells short-ellipsoid, 0.2 mm. long; bracts slenderly stalked, heads peltate, to 0.4 mm. across, these and perianths ciliate; peduncle 1–3 × 1 mm.; *female head* with the styles exserted to 0.5 mm. through a covering of peltate bracts, or through perforations or low papillae, the bracts scattered. *Syncarp* 1.5–6 cm. across, subglobose, the surface smooth, with scattered persistent bracts, the indumentum various; wall 1–5 mm. thick; proximal region of perianths free, fruiting perianths 1–12, thin-walled, "seeds" (pericarps with a horny endocarp), subglobose to ovoid, 8–10 × 7–8 mm.; core 5–8 mm. across; peduncle 1.5–4(–20) × 1.5–3 mm.

DISTRIBUTION: in forest or savannah to 5000 ft.; Assam, Burma, Siam, Indochina, southern China, Malaya, Sumatra, Borneo, northern and central Philippines.

Four taxa which have previously been recognized as species (with several additional synonyms) are here reduced to subspecific rank under *Artocarpus nitidus*, since they are only separable from this species and from each other on the size and indumentum of the syncarp, and on slight differences in the shape and venation of the leaves. The type subspecies, which occurs in the Philippines, is readily distinguished by the very small, few-seeded, velutinous syncarp. The two subspecies placed following this, ssp. *lingnanensis*, which extends from southern China to peninsular Siam, and ssp. *humilis*, which is restricted to Borneo, appear to be very closely allied to each other. They have larger, also velutinous

syncarps, and are distinguished only by minor, but characteristic, differences in the leaves. However, in view of the variation found in the length of the female peduncle in ssp. *humilis* (discussed under the subspecies), it seems best to retain them as distinct taxa of equal rank for the present. The remaining subspecies, which usually have more numerous lateral veins in the leaves than the three preceding entities, are ssp. *borneensis*, from Borneo, and ssp. *griffithii*, extending from Yunnan and Indochina to Sumatra and Borneo. They are likewise very closely related, differing only in the indumentum of the syncarp. In ssp. *borneensis* the surface is densely covered by minute hairs with readily deciduous, multicellular, clavate heads which, when fallen, often form a reddish powder around the dried syncarp. These hairs are presumably equivalent to the gland-hairs occurring generally within *Artocarpus*, although in subg. *Pseudojaca* the heads of the latter are usually unicellular. In ssp. *griffithii*, on the other hand, the syncarp is almost entirely glabrous.

The occurrence of three subspecies in Borneo has led to difficulties in identification which are increased by the finding of specimens, all bearing very small, elliptic, long-acuminate leaves, which are referable on the characters of the syncarp to all three entities. Larger-leaved collections of ssp. *humilis*, lacking or bearing only male inflorescences, can be distinguished on vegetative characters, but no such characters have been found that would separate ssp. *borneensis* and ssp. *griffithii*. Collections from Borneo which lack syncarps and which are referable to one or other of these subspecies, are listed separately under ssp. *borneensis*. There are, in addition, a few male or sterile collections from Borneo and elsewhere that could not be identified to subspecies and have not been cited. On the evidence of specimens bearing syncarps (none seen from western Borneo), ssp. *borneensis* is relatively common in British North Borneo, whereas ssp. *griffithii* is absent there, though widely distributed outside Borneo. The provenance of the small-leaved collections appears to be variable, since Corner noted for ssp. *griffithii* (Wayside Trees, 654. 1940, as *A. gomezianus*) that such specimens came from the crowns of large trees, whereas Beccari derived the specific epithet for *A. humilis*, of which the type has small leaves, from its being a small tree.

Three collections referable to *Artocarpus nitidus* have been seen from Burma and Assam, but they bear only male inflorescences and, from the shape of the leaves, might represent either ssp. *lingnanensis* or ssp. *griffithii*. They are: *Dickason 6938, 6981*, Rangoon (A, ♂); *Kanjilal 4145*, Makum Range, Barjan, Lakhimpur (K, ♂). A collection from the Lushai Hills, *Sen Gupta 7643*, is cited by Kanjilal *et al.*, Fl. Assam 4: 269. 1940, as *A. gomeziana* Wall. var. *griffithii* King (= ssp. *griffithii*).

KEY TO THE SUBSPECIES OF ARTOCARPUS NITIDUS

1. Syncarp to 1.5(–3) cm. across, velutinous, seeds 1–3(–6). . . . . ssp. *nitidus*.
1. Syncarp larger, seeds more numerous.
   2. Syncarp velutinous; larger leaves with 5–11 pairs lateral veins.

3. Leaves obtuse to shortly and bluntly acuminate. . . ssp. *lingnanensis*.
3. Leaves with an acumen to 2.5 cm. long, lateral veins often markedly ascending . . . . . ssp. *humilis*.

2. Syncarp not velutinous; larger leaves with 8–15 pairs lateral veins.
4. Syncarp covered by readily deciduous, clavate hairs. . . ssp. *borneensis*.
4. Syncarp subglabrous. . . . . ssp. *griffithii*.

ssp. **nitidus**

Artocarpus nitidus Tréc. Ann. Sci. Nat. Bot. III. **8:** 119. 1847, "*nitida*"; Miq. Fl. Ind. Bat. **1**(2): 288. 1859; Fern.-Villar, Noviss. App. 203. 1880; Vidal, Revis. Pl. Vasc. Filip. 254. 1886; Renner, Bot. Jahrb. **39:** 368. 1907; Elmer, Leafl. Philip. Bot. **2:** 624. 1909. Syntypes, Luzon, *Cuming 1078, 1081* (P); lectotype, *Cuming 1078* (P).

Artocarpus lanceolata Tréc. Ann. Sci. Nat. Bot. III. **8:** 121. 1847; Miq. Fl. Ind. Bat. **1**(2): 288. 1859; Fern-Villar, Noviss. App. 203. 1880; Vidal, Revis. Vasc. Pl. Filip. 255. 1886; Elmer, Leafl. Philip. Bot. **2:** 624. 1909. Holotype, Luzon, *Callery 60* (P); isotype (P).

Artocarpus lamellosa auct. non Blanco, Merr. Publ. Gov. Lab. Manila **27:** 80. 1905, Sp. Blancoanae, 124. 1918, Enum. Philip. Pl. **2:** 41. 1923.

Leaves 4–13 × 2–5.5 cm., obovate-oblong, with an acumen to 1.5 cm. long, base rounded, varying broadly cuneate, margin entire; juvenile leaves to 16 × 7.5 cm., denticulate towards the apex; lateral veins 6–9 pairs, curved; drying brown to blue-grey above, brownish or greenish below, the venation often straw-coloured, reddish in some young leaves. *Male head* 6–10 × 3 mm., oblong or clavate; peduncle 1–2 × 1 mm., velutinous. *Syncarp* to 1.5(–3) cm. across, drying light brown or cinereous, short-pubescent; seeds 1–3(–6); peduncle 2(–6) × 1.5 mm., velutinous.

DISTRIBUTION: in forest to 500 ft.; northern and central Philippine Islands.

Philippine Islands. LUZON. Ilocos Norte: Burgos, *Ramos BS 27283* (A, BO, P, ♂). Abra: *Valera PNH 13846* (A, PNH, ♀). Pangasinan: *Lopez FB 24217* (A, ♂, ♀), *Medina FB 13503* (US, ♂). Rizal: Calawan, *Callery 60*, 1840 (P, ♂). Cavite: Maragondong, *Merrill 4167* (BM, L, P, US, ♂). Batangas: *Merrill SB 100* (A, BM, BO, GH, K, L, P, ♂, ♀); Lobo, *Vidal 1540* (A, K, L, ♂, ♀). Laguna: Mt. Makiling, *Canicosa PNH 9802* (A, PNH, ♂), *Elmer 18279* (A, BM, K, L, ♂, ♀), *Sulit PNH 16923* (PNH). Albay: *Cuming 1078* (BM, CGE, K, L, P, SING, ♂), *1081* (BM, CGE, K, L, P, SING, ♂, ♀). TABLAS. *Cortes & Rendal FB 17845* (K, US, ♂, ♀). CEBU. *Lopez & Reyes FB 27333* (SING), *Ramos BS 11022* (BM, K, ♂). PANAY. Miagao, Ilo-ilo, *Vidal 3834* (A, K, ♂, ♀). GUIMARAS. *Sulit PNH 11697* (A, L, PNH, ♂, ♀); Buenavista, Bo. Salvacion, So. Lande, *Sulit PNH 11832* (A, L, ♂, ♀).

Artocarpus nitidus was reduced by Merrill in 1905 to the earlier *A. lamellosa* Blanco which has, since then, been accepted as the correct name for the species (in the restricted sense of *ssp. nitidus*). In making this identification Merrill was following Fernandez-Villar, who in 1880 had also regarded the two species as synonymous, although he retained Trécul's name. However, while Blanco's description undoubtedly refers to one of the three glabrous-leaved members of subg. *Pseudojaca* that occur in

the Philippines, it does not agree with the entity under consideration. *Artocarpus lamellosa* was described as having a fruit the size of a hen's egg, which was full of seeds, whereas in *A. nitidus* ssp. *nitidus* the syncarp does not usually exceed 1.5 cm. in diameter or have more than three seeds. The account could apply to either of the two other species, *A. xanthocarpus* Merr. (1904) or *A. rubrovenius* Warb. (1905), but no characters are given that would differentiate between them. In view of the long-standing misidentification it seems best, therefore, to reject *A. lamellosa* as a *nomen dubium*.

Artocarpus nitidus ssp. *nitidus* has frequently been confused with *A. xanthocarpus*, but the latter is distinguished by the globose to obovoid, rather than oblong or clavate male head (3–6 × 3–4 mm. *vs.* 6–10 × 3 mm.), by the longer styles (exserted to 0.8–1 mm. *vs.* 0.5 mm.), and by the larger syncarp (to 5 cm. *vs.* 1.5(–3) cm. across) with a longer peduncle (6–11 mm. *vs.* 2(–6) mm.) and several (instead of 1–3(–6)) seeds. In *Artocarpus nitidus* ssp. *nitidus* the leaves are usually obovate-oblong with a rounded base, and dry (when mature) blue-grey above and light brown beneath; in *A. xanthocarpus* the leaves are longer and narrower in outline, with a cuneate or sometimes narrowly rounded base, and they dry brown or greenish on both surfaces. Merrill, in 1923, reduced *A. xanthocarpus* to *A. lanceolata* Tréc. but examination of Trécul's type has shown that it is merely a collection of *A. nitidus* ssp. *nitidus* with rather narrow leaves, the male inflorescences being characteristic of the latter entity. *Artocarpus rubrovenius* can be distinguished from both these taxa by the larger male inflorescences and leaves, the latter often having a broadly rounded and oblique base.

The specimen *Borden FB 2946* (BO, SING), which Merrill cited in his enumeration of the flora of the Lamao Forest Reserve (Philip. Jour. Sci. 1, Suppl. 43. 1906) under *A. lanceolata* (as a species distinct from *A. nitidus* and *A. xanthocarpus*) must be referred to *Antiaris toxicaria* Lesch. Elmer (1909) cited under *A. lanceolata*, with some doubt, *Borden 1145* from the same locality, but, unless this is the field number of the same collection, no specimens have been seen in the course of this study.

ssp. **lingnanensis** (Merr.) Jarrett, stat. nov.

Artocarpus parva Gagnep. Bull. Soc. Bot. Fr. **73**: 89. 1926; Gagnep. in Lecomte, Fl. Gén. Indoch. **5**: 735. *fig. 90*. 1928. Syntypes, Tonkin (cultivated), *Balansa 740*, *4112*, *4544*, *Bon 412*, *466*, *Fleury 37765* (P); lectotype, *Balansa 4112* (P).

Artocarpus sampor Gagnep. Bull. Soc. Bot. Fr. **73**: 90. 1926, excl. syncarp.; Gagnep. in Lecomte, Fl. Gén. Indoch. **5**: 738. 1928. Syntypes, Cambodia, *Chevalier 31915*, *36953*, *Fleury 30049*, Cochinchina, *Pierre 1637* (excl. syncarp), Annam, *Poilane 6879*, Siam (cultivated), *Thorel 2784* (P); lectotype, *Poilane 6879* (P).

Artocarpus lingnanensis Merr. Lingnan Sci. Jour. **7**: 302. 1931, **13**: 56. 1934. Syntypes, Kwangtung (cultivated), *McClure 13471* (UC, not seen; duplicates examined, K, P), Honam Island, *McClure s.n.*, Sept. 1924 (UC, not seen).

Leaves 6–14 × 3.5–8 cm., elliptic to oblong- or obovate-elliptic, the outline often somewhat irregular, obtuse or shortly and obtusely acuminate, base rounded or cuneate, usually slightly decurrent, margin entire or shallowly and irregularly crenate; lateral veins 6–10 pairs, straight or curved; drying brown or grey, venation concolorous or, in young leaves, nigrescent. *Male head* 4–12 × 3–4 mm., obovoid, varying oblong; peduncle 1–1.5 × 1 mm., velutinous. *Syncarp* to 5 cm. across, red with pink flesh, drying brown, velutinous; seeds c. 5–12; peduncle 1.5–3 × 2 mm., velutinous.

VERNACULAR NAMES: *ma hat*, Siam; *sampor*, Cambodia; *cay chay*, Annam; *hung kwai muk*, *kwai muk*, southern China. USES: planted for the edible fruit; the bark and roots are also added to betel.

DISTRIBUTION: in evergreen and mixed forest, and in savannah, to 3000 ft.; Siam, Indochina, southern China (Kwangtung, Hainan); cultivated, especially in Tonkin.

Siam. Chantaburi, Klung, *Kerr 17956* (BM, ♀); Chantaburi, Ma Kaun Kaim, *Kerr 493* (BM, ♂); Kao Ngon, Loi, *Kerr 8795* (BM, ♂); Ko Chang, *Schmidt 129* (C); Sriracha, *Collins 892* (US, ♀). PENINSULAR SIAM. Krabi, Tambon Kao Panom, *Kerr 18647* (BM, ♀); Satul, Kuan Po, *Kerr 13809* (BM, ♂); Surat, Tha Chang, *Ratn 2373* (CGE, ♂). **Indochina.** CAMBODIA. *Béjeaud* (P, ♀). Kompong Chnang Prov.: near Kompong Chnang, *Chevalier 31915*, Mar. 1914 (P, ♀); Kralanh For. Res., *Fleury 30049*, Mar. 1914 (P, ♀); Prey Chang Ka Tamau, *Chevalier 36953*, Jan. 1918 (P, ♂, ♀); Prey Phum Laung, *Chevalier 36903* (P, ♂). Stung Treng Prov.: between Pra Pranap and Chéom Khsan, *Poilane 14881* (P, ♂). COCHINCHINA. Bien Hoa Prov.: Song Lu, *Pierre 1637*, Mar. 1877 (K, P, US, all with fruit of *A. gomezianus* ssp. *gomezianus* [A, sterile twig of *A. gomezianus*]). ANNAM. Kontum Prov.: between Zakha and Dakto, *Poilane 32307* (P, ♂). Nhatrang Prov.: peninsula of Nui Han Heo, *Poilane 6879*, June 1923 (A, P, ♀); near Pham Rang, *d'Alleizette*, June 1919 (P, ♀). TONKIN. Phu Tho Prov.: Trung-Giap For. Res., *Fleury 37615* (P, ♀).

China. KWANGTUNG. Near Canton, *Levine 2807* (A, ♂), *2124* (A, GH, K, ♀); Chung Shan Ooi T'ung, *Fung Hom 68* (NY, ♀); Heungshan, *Chun 1* (NY); Honam Island, *Levine 1009* (A, GH, US, abnormal infl.). HAINAN. *Wang 32813* (A, NY, P, ♀); Ch'ang-kiang district, Ue Lung Ling, *Lau 1349* (A, BM, P, ♂); Kan-en district, Chim Fung Ling, *Lau 3385* (A, P, ♂), *5644* (A, ♀); Kaingchow, *Henry 8255* (K, P, ♀); Lokwui, *How 72283* (A, ♀); Man Ch'eung district, *McClure 20016* (K, ♂); near Manning, *How 71529* (A, SING, ♂); Ngai district, Ko Leng, *Lau 566* (A, BM, K, P, US, ♀); Yiachow, *Liang 62103* (A, NY, P, US, ♀).

Cultivated. SIAM. Ubon, Kemmarat, *Thorel 2784*, 1866–1868 (A, P, ♂). INDOCHINA. Cochinchina: Saigon, Hort. Bot., *Pierre 18* (P), *Ciep 553* (P, ♀). Annam: Haut Douai Prov., Laonan, *Poilane 23405* (P, ♂), near Tourane, *Clemens 3369*, *3988* (A, ♀). Tonkin: Hanoi and vicinity, *d'Alleizette*, May 1908 (L), *Balansa 740*, July 1885 (P, abnormal infl.), *4112*, May 1889 (P, ♂), *4544* (P, ♀), *Fleury 37765*, Apr. 1918 (P, ♂); Ninh-binh Prov., Ton Dac, *Bon 412* (P, ♂), Ninh-binh Prov., Yen Moi, *Bon 466*, May 1881 (P, ♂); Quang Yen Prov., region of Yen Lap, *Chevalier 37584* (P, ♂). CHINA. Kwangtung: Canton Christian College Campus, *Kwok Yan 9973* (NY, ♀), *McClure 13471*, May 1925 (K, P, ♀), *To Kang Ping 11178* (NY, US, ♀), *13898* (A, BM, K, L, P, US, ♀).

Of the three synonyms available to provide an epithet for this subspecies of *Artocarpus nitidus* it seems desirable to choose *A. lingnanensis*, which was described by Merrill in 1931. The two species, *A. parva* and *A. sampor*, that were published simultaneously by Gagnepain in 1926, had somewhat confused descriptions and the second of the species was, furthermore, based on mixed material.

One of the syntypes of *Artocarpus parva*, *Balansa 740*, bears an abnormal inflorescence with free, tubular perianths, which measures 10 × 8 mm. This corresponds to the maximum size given by Gagnepain for the male head and is apparently the source of the difference from the measurements given above (4–12 × 3–4 mm.). He was also in error in describing and drawing the male perianths as tubular and shortly 4-lobed; in the collection he examined (shown by the sketch attached to the sheet), and in others, the perianths have been found to consist of free segments.

The description of the syncarp of *Artocarpus sampor* was based on *Pierre 1637*, which consists at Paris, Kew, and Washington of a sterile shoot of *A. nitidus* ssp. *lingnanensis* and a detached syncarp, about 7.5 cm. in diameter with a peduncle 3.5 cm. long, which agrees in its characters with *A. gomezianus* ssp. *gomezianus*. It was presumably the large size of the latter that misled Gagnepain into describing a female head of ssp. *lingnanensis* at anthesis as the male inflorescence (shown by a drawing attached to *Fleury 30049*), and thus into stating that the male head was globose and 10 mm. in diameter.

ssp. **humilis** (Becc.) Jarrett, stat. nov.

Artocarpus humilis Becc. For. Borneo, 629. 1902; Renner, Bot. Jahrb. **39**: 369. 1907. Holotype, Sarawak, *Beccari PB 3128* (FI); isotypes (FI, K, P).

Leaves 6–18 × 1.5–8 cm., elliptic, varying obovate-elliptic, with an acumen to 2.5 cm. long, base cuneate, margin entire; lateral veins 5–9 pairs, curved, ascending; drying red-brown to pale brown, lighter beneath, venation concolorous or straw-coloured. *Male head* 5–6 × 3–4 mm., obovoid; peduncle 1 × 1 mm., velutinous. *Syncarp* (submature) to 2 cm. across, drying pale brown, short-pubescent; peduncle 2–20 × 3 mm., velutinous.

VERNACULAR NAMES: *selangking*, west Borneo; *betoh*, *tampang*, south and east Borneo.

DISTRIBUTION: in evergreen forest to 3000 ft.; Borneo.

Borneo. SARAWAK. Batan Lupar, Marop, *Beccari PB 3128*, Mar. 1867 [1866 on label] (FI, K, P, ♂, ♀). WEST BORNEO. Melawi, *bb 27034* (BO, L); Pamangkat, Paloh, *bb 11345* (BO); Pontianak, Batu Ampar, *bb 17421* (A, BO, L, ♀); Simpang, Lubuk Batu, *bb 7333* (BO). SOUTH AND SOUTHEAST BORNEO. Sungei Malohapan, Buntok, *Lot Obi 2140* (BO, L, ♀). EAST AND NORTHEAST BORNEO. E. Kutei: Loa Djanan, near Samarinda, *Kostermans 6363* (K, L, SING), *9953* (L); Tandjong Banko, near mouth of Mahakam River, *Kostermans 7129* (L, SING, ♀). W. Kutei: near Muara Kamaw, bank of Mahakam River, *Endert*

1704 (A, K, L, ♀). BRITISH NORTH BORNEO. Mt. Kinabalu, Dallas, *Clemens 27571* (BM, K, L, SING, ♀).

As noted in the general discussion of *Artocarpus nitidus*, the length of the peduncle of the female inflorescence in ssp. *humilis* shows considerable variation. In four collections, namely, *Beccari PB 3128* and *Clemens 27571* (at anthesis) and *bb 17421* and *Kostermans 7129* (submature), the peduncles are about 2 mm. long. In two others, *Endert 1704* (at anthesis) and *Lot Obi 2140* (submature), the peduncles are 16–20 mm. long. This variability is not correlated with any other character and, therefore, in view of the rather distinctive appearance of the larger leaves which have markedly curved, ascending veins, all the specimens are at present assigned to a single taxon.

In his description of *Artocarpus humilis*, Beccari stated that the female inflorescence had some unopened male flowers. No such inflorescence has been found on the type collection, the male and female heads being quite normal in appearance, but Beccari was presumably describing one of the abnormal inflorescences quite frequently found in *A. nitidus*.

ssp. **borneensis** (Merr.) Jarrett, stat. nov.

Artocarpus borneensis Merr. Jour. Str. Br. Asiat. Soc. **85**: 165. 1922. Holotype, British North Borneo, *Ramos 1592* (PNH, not seen, photograph in A); isotypes (A, BM, BO, K, L, P, SING).

Leaves 3.5–23 × 1.5–9 cm., elliptic-oblong, varying obovate- or ovate-oblong, attenuate or acuminate, base cuneate or rounded, margin entire; lateral veins 8–15 pairs, curved; drying dark brown to blue-grey above, pale red-brown to greenish beneath, venation concolorous or straw-coloured. *Male head* 3.5–10(–12) × 2.5–7 mm., obovoid or clavate; peduncle 1.5–3 × 2 mm., subappressed-pubescent. *Syncarp* to 6 cm. across, brownish green to purple, drying chestnut- to purple-brown, with a dense indumentum of readily deciduous, clavate, multicellular hairs; peduncle 2–4 × 3 mm., subappressed-pubescent to puberulent.

DISTRIBUTION: in evergreen forest to 5000 ft.; Borneo.

Borneo. SARAWAK. 12 mile Penurision road, *Egon A 0921* (KEP, ♀). EAST AND NORTHEAST BORNEO. Balikpapan: Gunong Beratus, *Kostermans 7365* (K, L, PNH, ♀). W. Kutei: near L. Petah, *Endert 3191* (A, L, SING, ♂, ♀). BRITISH NORTH BORNEO: Mt. Kinabalu, Dallas, *Clemens 26350* (A, BM, BO, K, L, NY, ♀); Mt. Kinabalu, Gurulau Spur, *Clemens 50472* (A, BM, K, L, ♀); Penibukan, *Clemens 31233* (A, BM, K, L, NY), *40504* (BM, K, ♀); near Sandakan, *Ramos 1592* (A, BM, BO, K, L, P, SING, ♀); Sandakan, Batu Lima, *Ramos 1749* (A, BO, K, P, SING, ♂, ♀).

The following collections are referable either to ssp. *borneensis* or to ssp. *griffithii*.

Borneo. SARAWAK. Kuching, Semengoh For. Res., *Herb. Sar. Mus. 7728* (K, L, ♂); Saribas, Pakeo, *Haviland & Hose 3315* (A, BM, K, L, ♂). WEST BORNEO. Ketapang, Muara Kajan, Sungei Kelilo, *bb 7460* (BO); Palo, *Becking 44* (BO).

SOUTH AND SOUTHEAST BORNEO. Martapura, Kalaan, *bb 12054* (BO); Pleihari, Kintap, *bb 7759, 7761* (BO); Sampit, Sansang, *bb 10538* (BO). EAST AND NORTHEAST BORNEO. Berouw: Tandjong Redeb, Labanan, *bb 11508* (BO). E. Kutei: Sg. Tiram, *bb 35021* (K, L, abnormal infl.). W. Kutei: Tandjong Isui, *Endert 1954* (K, L).

ssp. **griffithii** (King) Jarrett, comb. et stat. nov.

Artocarpus gomeziana Wall. var. *griffithii* King in Hook. f. Fl. Brit. Ind. **5:** 544. 1888; King, Ann. Bot. Gard. Calcutta **2:** 16. *t. 14B*. 1889. Syntypes, Malaya, *Griffith 4665*, *King 6651*, *7533*, *Scortechini 683* (CAL, not seen; duplicates examined, K, SING, etc.).

Artocarpus eberhardtii Gagnep. Bull. Soc. Bot. Fr. **73:** 87. 1926; Gagnep. in Lecomte, Fl. Gén. Indoch. **5:** 737. 1928. Holotype, Annam, *Eberhardt 3288* (P).

Artocarpus eberhardtii Gagnep. var. *poilanei* Gagnep. Bull. Soc. Bot. Fr. **73:** 87. 1926; Gagnep. in Lecomte, Fl. Gén. Indoch. **5:** 737. 1928. Syntypes, Laos, *Poilane 11777*, *11955* (P); lectotype, *Poilane 11955* (P).

Artocarpus griffithii (King) Merr. Pap. Mich. Acad. I. **24:** 64. 1939.

Artocarpus gomezianus auct. non Tréc., King, Ann. Bot. Gard. Calcutta **2:** 15. 1889, pro parte, quoad *t. 14A* et spec. *King 4189*, *5078*, *7535*, *8838*; Renner, Bot. Jahrb. **39:** 368. 1907; Ridley, Fl. Malay Penin. **3:** 355. 1924; Corner, Wayside Trees, 654, *t. 195*. 1940; Watanabe, Ic. Econ. Pl. S. Asia, 528. 1945.

Artocarpus lanceolata auct. non Tréc., Gagnep. in Lecomte, Fl. Gén. Indoch. **5:** 738. 1928.

Differs from ssp. *borneensis* as follows: *syncarp* orange-pink with bright pink flesh, or yellow, nigrescent on drying, glabrous or with sparse rufous hairs; peduncle 3–5(–15) mm.

VERNACULAR NAME: *tampang* (Malay), Malaya and Sumatra. USES: the syncarp is edible.

DISTRIBUTION: in evergreen forest to 5000 ft.; peninsular Siam, Indochina, Yunnan.

Siam. PENINSULAR SIAM. Kantang, *Haniff & Nur 3298* (SING, ♀); Pattani, Toh Moh, *Kerr 584* (BM, ♂). **Indochina.** CAMBODIA. Kampot Prov.: Cam Chay Mts., near Kampot, *Pierre 4696* (A, BM, K, P, ♀). Pursat Prov.: near Trassay, *Poilane 15094* (P, ♀). ANNAM. Thu Thien Prov.: near Huê, *Eberhardt 3288* (P, ♂). LAOS. Savannaket, *Poilane 11777*, Jan. 1925 (K, P, ♂), *11955*, Feb. 1925 (P, ♂); Tatom, Chieng Kwang, *Kerr 20844* (BM, K, ♂); upper Tchépone and Quangtri River, *Poilane 13524* (A, P, ♀). **China.** YUNNAN. Che-li Hsien, *Wang 78652* (A, ♀); Fo-hai, *Wang 77124* (A, ♂).

Malaya. KEDAH. Katumbah, *Boswell KEP 12581* (KEP, ♀); Kuala Muda, *Ali KEP 73794* (KEP, ♀); Semling, Kedah Peak, *Bell & Haniff*, Mar. 1911 (K, ♂, ♀). PROV. WELLESLEY. *Ridley 12624* (BM, ♀). PERAK. *King 6651*, Sept. 1884 (SING, ♀), *Scortechini 683* (K, SING, ♀), *1837* (K, ♂); 14 miles Bruas, *Hashim KEP 207* (KEP, ♀); Larut, *King 4189* (K, ♀), *5078* (K, P, SING, ♀), *7533*, Apr. 1885 (BM, CGE, K, P, SING, ♀), *7535* (BM, K, SING, ♀); Matang, Jamba, *Wray 2520* (SING, ♀); Taiping Hill, *Haniff SFN 13201*, *Ridley 11393* (K, SING, ♀); Ulu Selangor, *King 8838* (K, L, ♀); Waterfall Hill, *Wray 2073* (SING, ♀). DINDINGS. Bruas, *Murdoch 207* (SING, ♀). KELANTAN. *Walton*

KEP 32682 (KEP). TRENGGANU. Kemaman, *Corner SFN 30568* (SING, ♀). PAHANG. Kuantan: Bukit Belai, Betinbang Chini, *Lambak CF 2716* (K, SING, ♀); Bukit Sembambu, *Soh KEP 15742* (KEP, ♂, ♀). SELANGOR. Ampang For. Res., *Strugnell KEP 12720* (KEP, ♀); Bukit Kulu, *Goodenough 10535* (CAL, SING, ♀); Kanching, *Symington CF 20192* (SING); Kepong, *Murdoch 314* (BM, ♀); Kepong, Bukit Lagong For. Res., Sungei Kroh, *Sinclair SFN 40120* (KEP, L, ♂); Klang Gate, *Murdoch 94* (BM, ♀); Kuala Lumpur, *Curtis 2386* (BM, SING, ♀); Kuala Lumpur, Carcosa Domain, *Foxworthy 10944* (SING, ♂); Kuala Lumpur, Public Gardens [? planted], *Ahmad CF 3034, 4986* (K, SING. ♂, ♀), *Omar CF 8872* (K, SING, ♀), Kuala Lumpur, Weld Hills For. Res., *Hashim CF 3002* (K, SING, ♀); 20th mile Pahang road, *Ridley 8466* (SING, ♂). NEGRI SEMBILAN. Bukit Kaju Arang, *Alvins* (SING); Bukit Payong, *Alvins 772* (SING); Nilai Jindaram Estate, *Shah 65* (K, L, ♂); Tampin, Kuala Pila road, *Nur SFN 2814* (K, ♂); Tampin, Seremban road, *Nur SFN 1414* (K, SING, ♀). MALACCA. *Griffith 4662* (K, P, ♀), *4665*, 1845 (GH, K, P, ♂, ♀), *s.n.* (CGE, K, ♂, ♀), *Maingay 1482* (K, ♂, ♀); Brisu, *Derry 551* (P, SING, ♀); Bukit Bruang, *Derry 435* (SING, ♀); Bukit Senggeh, *Goodenough 1835* (BM, SING, ♀); Panchor, *Goodenough 1667* (SING, ♀); Selandar, *Alvins 246* (SING, ♀); Sungei Udang, *Alvins 1* (SING, ♀); 14th mile Sungei Udang For. Res.. *Sinclair SFN 40565* (K, SING, ♀); N. Sunklar, *Alvins 58* (SING, ♀). JOHORE. 7th mile Kota Tinggi-Mawai road, *Corner SFN 21349* (A, BM, BO, K, SING, ♂, ♀). PENANG. Government Hill, *Curtis 657*(K, SING, ♂, ♀); Penara Bukit, *Curtis 1201* (K, SING, ♀). SINGAPORE. *Hullett 16* (SING), *Marton 90* (K, ♂); Changi, *Ridley 4832* (SING, ♀).

Sumatra. ATJEH. Gajo Lueus, Penosan, Gunong Gerupal, *bb 22364* (A, BO, L). TAPANULI. Angkola and Sipirok, Panobasan, *bb 25248* (A, BO, L, ♀). WEST COAST. Mt. Sago near Pajakumbuh, *Meijer 4056a* (L, ♀ and abnormal infls.), *4746* (L, abnormal infls.); Painan, Barung Balantai, *NIFS SWK/I–15* (BO). EAST COAST. Asahan: Aek Munte, *Rahmat si Boeea 9293* (A, L, ♀); Huta Padang, *Krukoff 4372* (A, BO, NY, SING, ♀); near Lumban Ria, *Rahmat si Boeea 7514, 8042* (A, L, SING, ♀). PALEMBANG. *Praetorius* (L); Banjuasan and Kubustreken, Bajunglintjir, *NIFS T 704* (BO, L, U, ♂, ♀); Lematang Ilir, Gunong Megang, *NIFS T 808* (BO, L, ♀); Muara Dua, Kisau, *bb 9231* (BO).

Borneo. SARAWAK. Kuching, 6th mile For. Res., *Herb. Sar. Mus. 9436* (K, L, ♀). EAST AND NORTHEAST BORNEO. E. Kutei: Samarinda, Loa Djanan region along road to Balikpapan, *Kostermans 10202* (K, ♀).

In describing *Artocarpus gomezianus* var. *griffithii*, on which ssp. *griffithii* is based, King failed to distinguish accurately between the type and his variety, although the latter differs clearly in the shorter petioles and peduncles, the smaller, narrower male head, and the glabrous syncarp. King's description of *A. gomezianus* [ssp. *gomezianus*] was partly based on specimens which should have been referred to the variety and the illustration (*t. 14A*) was drawn from one of these. In consequence the two entities were not distinguished by later authors and Malayan collections of both were identified as *A. gomezianus*. Merrill, in 1939, realized that they should be assigned to two distinct species, and raised var. *griffithii* to specific rank, without, however, noting any affinity between it and *A. borneensis*, described by him in 1922.

Artocarpus nitidus ssp. *griffithii* is considerably more common and

widely distributed in Malaya than *Artocarpus gomezianus* ssp. *gomezianus*, and the descriptions under *A. gomezianus* given by Ridley (1924) and Corner (1940) are based solely on ssp. *griffithii*.

Several specimens of ssp. *griffithii* from peninsular Siam, the northern part of Malaya, and Penang have syncarps with rather long peduncles (to 15 mm.), but they otherwise agree well with the rest of the collections assigned to this subspecies. The edible ripe syncarp is described in Malaya as orange-pink with bright pink flesh (fide Corner, 1940, and various field notes), but in Indochina the notes on several collections state that it is yellow. In spite of evidence in this species, as in *A. fretessii*, of some confusion with the male inflorescences, there appears to be a genuine difference in colour. No further information is available concerning the precise distribution of the two variants, but, according to present evidence, the pink form occurs south and the yellow form north of a discontinuity in the distribution of the subspecies between peninsular Siam and Indochina.

Series **Clavati** Jarrett, ser. nov.

Inflorescentiae bracteis interfloralibus clavatis vel spathulatis. *Capitula mascula* cellis antherum 0.3–0.5 mm. longis.

TYPE SPECIES: *Artocarpus hypargyreus* Hance.

44. **Artocarpus petelotii** Gagnep. Bull. Soc. Bot. Fr. 73: 89. 1926; Gagnep. in Lecomte, Fl. Gén. Indoch. **5**: 739. 1928. Holotype, Tonkin, *Petelot s.n.* (P).

Artocarpus brevisericea C. Y. Wu & W. T. Wang, Acta Phytotax. Sin. **6**: 273. *t. 55, fig. 22.* 1957. Holotype, Yunnan, *Exped. Biol. Sino-ross. ad prov. Yunnan 1196* (PE ?, not seen); isotype (A).

Trees, height to 10 m. *Twigs* 3–4 mm. thick, pubescent, hairs white or rufous, patent, straight. *Leaves* 9–23 × 4–9 cm., elliptic to narrowly elliptic, with an acumen to 1.5 cm. long, base cuneate, margin entire or denticulate towards the apex; main veins and reticulum prominent beneath; glabrous above except for the pubescent main veins, venation beneath moderately to thinly pubescent, hairs rufous or colourless, straight; lateral veins 7–11 pairs, curved, ascending; intercostals few, parallel; drying grey-green or dingy brown, paler beneath, venation concolorous or straw-coloured; petiole 13–18 mm. long.

Inflorescences solitary in leaf-axils. *At anthesis: male head* 18–23 × 5–7 mm. (fide Wu & Wang, 1957), narrowly obovoid; perianths of 2 or 3 spathulate, free segments 0.8 mm. long; stamen (not exserted), anther-cells oblong, 0.35 mm. long; bracts stoutly to slenderly stalked, heads spathulate, secund, to 0.7 mm. across, these and perianths densely pubescent; peduncle 5–10 mm. long (fide Wu & Wang, 1957), greyish pubescent; *female head* irregularly rugose and papillate, with the styles exserted to 1.5 mm. through low papillae (2–)3(–4)-fid at the apex,

and longer, cylindric papillae projecting to c. 1.5 mm. scattered on the surface between these. *Syncarp* to 3 cm. across, subglobose, shallowly lobed, drying rufous, pubescent, smooth over the lobes, the surface between papillate, the longer papillae mostly broken off; wall c. 2 mm. thick; proximal region of perianths fused above, walls double and separable below, fruiting perianths 1–8(?), slightly fleshy, "seeds" (pericarps with a horny endocarpic layer) ellipsoid, 13 × 10 mm.; core c. 5 mm. across; peduncle 35–40 × 3 mm., pubescent.

DISTRIBUTION: in forest to 6000 ft.; Tonkin and Yunnan.

Indochina. TONKIN. Chapa, *Petelot 6028* (A, P, ♀); [probably Cho-ganh, fide Gagnepain, 1926] *Petelot* (P, ♀). **China.** YUNNAN. Chin-ping, Ho-touchai, *Exped. Biol. Sino-ross. 1196*, May 1956 (A, ♂).

The two collections of *Artocarpus petelotii* from Tonkin bear female inflorescences; these are at anthesis on the holotype and mature or nearly so on *Petelot 6028* (collected in 1930). The styles are exserted through low papillae with lobed apices, but between these the surface bears, in addition, numerous larger, irregular papillae. The presence of the latter, and the complete absence of discoid peltate bracts indicates an affinity with the two other species assigned to series *Clavati*, rather than with any member of series *Peltati*, although the leaves are patent-pubescent beneath instead of tomentulose, as in these two species.

The recent collection cited from Yunnan bears male inflorescences and shows a strong vegetative resemblance to the Indochinese specimens, apart from a difference in the colouration when dried, which will be discussed below. This collection was described in 1957 as *Artocarpus brevisericea* by Wu and Wang, who compared it with *A. hypargyreus*, but made no mention of *A. petelotii*. They noted that the interfloral bracts in the male inflorescence differed in shape from the clavate bracts found in *A. hypargyreus*, but described them incorrectly as peltate, and thus presumably regarded them as similar to the bracts of *A. ficifolia* (= *A. lakoocha*), published by Wang in the same paper (A preliminary report on the study of the tropical and subtropical flora of Yunnan I. Acta Phytotax. Sinica 6: 267–300. *t. 55*. 1957). The heads of the bracts are not, however, discoid and centrally attached, with a ciliate margin, as in *A. lakoocha* and other members of series *Peltati*, but spathulate and secund, with a densely pubescent upper surface. In the smaller, slenderly stalked bracts the shape is easily observable, but it is somewhat obscured by the pubescence in the scattered, larger, stoutly stalked bracts. Thus, in the shape of the interfloral bracts this collection, also, shows an affinity with the other species of series *Clavati*, an affinity which is confirmed by the large size of the anthers (fully developed in the inflorescences on the isotype at the Arnold Arboretum, although not yet exserted).

The three collections resemble each other closely in the shape and venation of the leaves, and in the type and distribution of the indumentum, which consists of patent hairs having a rather broad lumen, especially on the twigs. However, whereas in the isotype of *A. brevisericea* the hairs

are colourless or whitish, giving a greyish tinge to the specimen, and the leaves dry grey-green, in the Petelot collections most of the hairs are rufous, though some are colourless, and the leaves dry a dingy brown. The latter colouration is abnormal for this series, since both *A. hypargyreus* and *A. styracifolius* dry grey or grey-green, with a greyish pubescence, and it is perhaps an artifact due to the method of drying.

In view of the vegetative similarity of the three collections except in their colour when dried, and the general agreement of the characters of both the male and the female inflorescences with those of the other members of series *Clavati*, it is assumed that only a single species is represented, and *A. brevisericea* is therefore reduced to *A. petelotii*.

45. **Artocarpus hypargyreus** Hance in Benth. Fl. Hongkong. 325. 1861, "*hypargyrea*"; Chung, Mem. Sci. Soc. China 1: 33. 1924; Walker, Lingnan Sci. Jour. 6: 51. 1930; Merr. ibid. 13: 56. 1934; Lee, For. Bot. China, 444. *t. 125*. 1935; Herklots, Hongkong Countryside, 153. 1951. Holotype, Hongkong, *Hance 4484*, June 1859 (K); isotype (BM).

Evergreen trees, height to 10 m., bark dark purple, peeling off in flakes. *Twigs* 1.5–2 mm. thick, finely rugose, greyish or rufous subappressed-pubescent. *Leaves* 8–17 × 4–8 cm., elliptic to obovate- or oblong-elliptic, acuminate, base cuneate, margin entire; juvenile leaves pinnatifid; main veins and intercostals prominent beneath, reticulum slightly so; glabrous above except for the puberulent midrib, venation beneath appressed-puberulent, glabrescent, intervenium minutely tomentose; lateral veins 7–9 pairs, curved; intercostals parallel or reticulate; dark green above, grey-green or whitish beneath, drying greyish above, greyish glaucous beneath from the tomentum, the main veins nigrescent; petiole 10–20 mm. long.

Inflorescences solitary in leaf-axils. *At anthesis: male head* 15–20 × 10–15 mm., obovoid to clavate; perianths of c. 4 linear or spathulate free segments 1 mm. long; stamen 1.2 mm. long, filament cylindric, anther-cells ellipsoid, 0.3 mm. long; bracts slenderly stalked, heads clavate, to 0.3 mm. across, these and perianths densely and minutely pubescent; peduncle 10–23 × 1 mm., shortly greyish pubescent; *female head* with the surface papillate and the styles exserted to 0.5 mm. through perforations between the papillae. *Syncarp* (submature) to 2 cm. across (the size of an apricot, fide Herklots, 1951), subglobose, yellow or apricot with reddish orange flesh, drying brown, pubescent, nearly smooth, papillae persistent but inconspicuous; proximal region of perianths free, fruiting perianths c. 12 (fide Herklots, 1951); peduncle 35–50 × 2.5 mm., short-pubescent.

VERNACULAR NAMES: *hung kwai muk*, *kwai muk*.

DISTRIBUTION: in forests and open woods, southern China (Kwangtung, Hainan, Hongkong).

China. KWANGTUNG. Lochang district, Yao Shan, Tau Kung, *Tso 20851* (A,

K, P, SING, ♂, ♀); Sin-fung district, Hau T'ong Shan, Fuk Lung Monastery, *Taam 885* (A, ♀); Sin-fung district, Sha Lo Shan, Lo Lo Ha, *Taam 929* (A, ♀); Tapu district, Tai Mo Shan, *Tsang 21182* (A, K, P, ♀). HAINAN. *Ford* (A, ♀); Ching Mai district, Pak Shik Ling, Ku Tung village, *Lei 448* (A, K, L, NY, P, SING, ♂); Taam Chau district, Hung Shek Shan, *Tsang 16850* (A, K, ♂). HONGKONG. *Chun 40037* (NY, ♂), *Hance 4484*, June 1859, and 1878 (BM, K, ♂, ♀), *s.n.* (GH, K, ♂, ♀); Aberdeen New Road, near Little Hongkong, *Chun 7460* (NY, ♀), *Gibbs 7473* (A, ♂); Mt. Gough, *Bodinier 1208* (P, ♀); Pokfoolung stream, *Esquirol 1167* (P, ♂, ♀); Shuitong Road near Peak, *Taam 2259* (A, US, ♂, ♀); Ty-tam-took, *Lamont 696* (BM). **Cultivated.** CHINA. Hongkong, Hort. Bot., *Fond*, July 1880 (K, ♀).

The surface of the syncarp in *Artocarpus hypargyreus* is papillate between the perforations through which the styles are exserted at anthesis. By analogy with the structure of the male inflorescence, it is assumed that in this species, and also in *A. petelotii*, the papillae are formed by the heads of interfloral bracts.

Artocarpus hypargyreus is readily distinguished from *A. styracifolius* when sterile by the broader leaves having a slightly prominent reticulum, and by the stouter, pubescent twigs. It may be noted that the western Malaysian *A. glaucus*, which resembles these two species in having a minute tomentum on the under surface of the leaf, although it is not closely related, can be distinguished by the more numerous lateral veins (8–15 *vs.* 4–9 pairs), in addition to the inflorescence characters. Fernandez-Villar recorded *A. hypargyreus* incorrectly from the Philippines (Noviss. App. 203. 1880).

46. **Artocarpus styracifolius** Pierre, Bull. Soc. Bot. Fr. **52:** 492. 1905, "*styracifolia*"; Gagnep. in Lecomte, Fl. Gén. Indoch. **5:** 733. 1928; Wu & Wang, Acta Phytotax. Sin. **6:** 272. 1957. Holotype, Laos, *Spire 344* (P); isotypes (P).

Artocarpus bicolor Merr. & Chun, Sunyatsenia **1:** 52. 1930; Chun in Hu & Chun, Ic. Pl. Sin. **4:** 6. *t. 156.* 1935, descr. addend.; Merr. Lingnan Sci. Jour. **11:** 41. 1932; McClure, ibid. **13:** 586. 1934. Holotype, Kwangtung, *Wang & Ling 7409* (UC, not seen); isotypes (BM, K, P; K and P both as *Wong 7409*).

Trees, height to 20 m., bark dark grey, rough. *Twigs* 1–1.5 mm. thick, finely rugose, appressed-puberulent, soon glabrescent. *Leaves* 4–11 × 1.5–4 cm., elliptic to obovate-elliptic, with an acumen to 1.5 cm. long, base cuneate and decurrent, margin entire; juvenile leaves pinnatifid; main veins only prominent beneath; glabrous above, main veins appressed-puberulent beneath, glabrescent, intervenium minutely tomentose; lateral veins 4–8 pairs, curved; intercostals few, reticulate; deep green above, pale green or glaucous beneath, drying greyish green above, greyish glaucous beneath from the tomentum, the midrib reddish or nigrescent; petiole 6–12 mm. long.

Inflorescences solitary in leaf-axils. *At anthesis: male head* 6–12 × 4–7 mm., ellipsoid, obovoid or cylindric; perianths 2–3-lobed above,

1.3 mm. long; stamen 2.5 mm. long, filament slender, slightly tapered above, anther-cells oblong, 0.5 mm. long; bracts slenderly stalked, heads clavate, to 0.2 mm. across, these and perianths minutely pubescent; peduncle 5–13 × 1 mm., velutinous; *female head* with numerous flexuous cylindric processes and the styles exserted to 0.5 mm. through perforations in the surface between these. *Syncarp* to 4 cm. across, globose, yellow, drying red-brown, pubescent, bearing numerous flexuous, cylindric processes to c. 5 × 0.5 mm.; wall c. 2 mm. thick; proximal region of perianths fused, fruiting perianths to c. 6, thin-walled, "seeds" (pericarps with a horny endocarpic layer) globose, c. 10 mm. across; core c. 5 mm. across; peduncle (10–)18–25 × 2 mm., velutinous.

DISTRIBUTION: in thickets and forests to 4000 ft., often in dry localities, northern Indochina, southern China.

Indochina. LAOS. Phoutane, *Spire 334* (P, ♀); upper Tchépone, *Poilane 12219* (P, ♂). TONKIN. Pac-si, ne. of Mon-cay, *Tsang 26970* (A, ♀); Tien Yien, *Fleury 37946* (P). **China.** YUNNAN. Si-chour-hsien, Ting-mann, *Feng 12296* (A, ♂, ♀). KWEICHOW. Sanhoa, *Tsiang 6350* (A, K, ♂). KWANGSI. N. Lin Yen, Tsin Lung Shan, *Ching 6950* (A, NY, ♂, ♀); W. Poseh, Bako Shan, *Ching 7654* (A, NY, US, ♂); Sup-man-ta Shan, *Liang 69783* (A, ♂, ♀); Tou Ngok Shan, *Tsang 23151, 23259* (A, P, ♀). KWANGTUNG. Fang Ch'eng district, Kung P'ing Shan, T'aan Faan, *Tsang 26803* (A, ♂); North River, *Wang & Ling* (or *Wong*) *7409*, Nov. 1928 (BM, K, P, ♀); Poon Yue district, *Levine 3158* (A, ♀); Wang Yuen district, Fan Shiu Shan, near Fan Shiu Au, *Lau 2754* (A, ♀); Wang Yuen district, Tsing Wan Shan, near Wong Chuk Island, *Lau 2196* (A, ♂); Ying Tak, *Wang 30010* (BM, ♀). HAINAN. *Liang 62258* (A, ♂, ♀), *65506* (NY); Ah Ping, *Chung & Tso 43998* (A, NY, US, ♂); Dai Land, Dung Ka, *Chun & Tso 43895* (A, K, P, ♀); Hung Mo Tung, *Shing 816* (NY); Po-ting, *How 73288* (A, BM, P, ♂), *73505* (A, BM, P, ♀); Yiachow, *Liang 62258* (K, ♂).

Artocarpus styracifolius is unique among the species of subgenus *Pseudojaca* in that the syncarp is covered by flexuous processes. These have been mistaken by all previous authors for the elongate apices of perianths, but the styles can be seen to be exserted through perforations in the surface between the processes, and the latter apparently represent hypertrophied interfloral bracts (see the introductory paper for a discussion of their morphology, Jour. Arnold Arb. 40: 15. *fig. 4b*. 1959). In the male inflorescence the bracts are clavate, as in *A. hypargyreus*. The small, elliptic, acuminate, glaucous leaves are also very distinctive in their appearance.

In 1957, Wu and Wang reduced *Artocarpus bicolor* Merr. & Chun, under which name this species had been known previously in China, to *A. styracifolius*. These authors also cited the following collections from Yunnan, which have not been seen in the course of this study: *P. I. Mao 538, 551, 2356, 3066, 5416, 12296; Wang 85909, 86018, 86028.*

Section **Glandulifolium** Jarrett, sect. nov.

Folia margine glandulifera. *Capitula feminea* stylis bifidis.

TYPE SPECIES: *Artocarpus altissimus* (Miq.) J. J. Smith.

47. **Artocarpus altissimus** (Miq.) J. J. Smith, Ic. Bogor. 3: 79. *t. 233*. 1907, "*altissima*"; Douglas & Baas Becking, Bull. Jard. Bot. Buitenzorg III. 17: 291, 297. *t. 10*. 1947.

Morus ? *altissima* Miq. Fl. Ind. Bat. Suppl. 415. 1861. Syntypes, Sumatra, *Teysmann HB 3903, 3972* (L); lectotype, *Teysmann HB 3972* (L).

Grewia ? *subcordata* Miq. Fl. Ind. Bat. Suppl. 404. 1861; Burret, Notizbl. Bot. Gart. Berlin **9**: 736. 1926. Syntypes, Sumatra, *Teysmann HB 3734, 4042* (L); lectotype, *Teysmann HB 4042* (L).

Artocarpus altissima Teysm. & Binnend. Cat. Hort. Bog. 85. 1866, nomen nudum.

Deciduous trees, height to 30 m., stoutly buttressed, bark brown, peeling off in long flakes. *Twigs* 1.5–3 mm. thick, shallowly rugose, short-pubescent, soon glabrescent. *Leaves* 6–15 × 5–10 cm., ovate to ovate- or obovate-oblong, acuminate, base usually shallowly cordate, margin glandular-crenate; juvenile leaves with 1–2 pairs lateral lobes; main veins and intercostals prominent beneath, reticulum slightly so; puberulent above with the main veins short-pubescent, rather thinly pubescent on the venation beneath, glabrescent; lateral veins 5–9 pairs, straight, basal pair usually rather strongly developed and leaf base hence trinerved; intercostals parallel, basal tertiaries strongly developed; green (turning orange-yellow on the tree), drying blue-grey to brown above, paler brown beneath; petiole 10–25 mm. long, often geniculate at the junction with the lamina.

Inflorescences axillary on short-shoots borne on older wood before the new leaves appear. *At anthesis: male head* 5–8 × 2–3 mm., ellipsoid or cylindric; perianths of 4 free segments 0.7 mm. long, puberulent; (stamen not exserted), anthers oblong, 0.4 mm. long; bracts slenderly stalked, heads peltate, to 0.6 mm. across, ciliate; peduncle 5–7 × 0.5 mm., velutinous; *female head* 5 mm. across, globose, the surface velutinous, with deeply bifid styles exserted to 1 mm. through papillae, and numerous peltate bracts; proximal region of perianths fused; peduncle to 12 × 2 mm., velutinous. *Syncarp* . . . .

VERNACULAR NAME: *klutum*, Sumatra.

DISTRIBUTION: in evergreen forest to 1800 ft.; Sumatra, west Borneo.

Sumatra. ATJEH. Langsa, A. Tjanang, *bb 14504* (BO). TAPANULI. Angkola and Sipirok, *bb 5626* (BO, L). EAST COAST. Simelungun, G. Maligas, *bb 20436* (BO, L). PALEMBANG. *Heyne* (BO, L, ♂, ♀), *Praetorius* (L); Batu Radja, *Teysmann HB 3734* (BO, L); Muara Dua, *Teysmann HB 3903* (BO, L); Muara Enim, *Teysmann HB 4042* (BO, L); Sekaju Munie, *Teysmann HB 3972* (BO, L). LAMPONGS. Kebang, *Teysmann HB 4214* (BO, L). **Borneo.** WEST BORNEO. Sanggau, *bb 18789* (BO, L). **Cultivated.** JAVA. Bogor, Hort. Bot., *HB 7241* (BO), *VIII B 46* (L).

The material available of *Artocarpus altissimus* is inadequate for the preparation of a full description of the species. The type is sterile, as are all the other collections cited, except for one made by Heyne in

Palembang which has inflorescences at anthesis. These agree with the description, based on material from two trees in the Hortus Bogoriensis, that was published by J. J. Smith in transferring Miquel's *Morus altissimus* to *Artocarpus*. Smith stated that the syncarps did not mature on these trees, but I am informed by Mr. E. J. H. Corner that he found fruit on them containing seeds measuring c. 7 × 5 mm. The germination of these was characteristic of *Artocarpus*, since the cotyledons remained enclosed in the seed-coat, while the epicotyl lengthened and the first pair of foliage leaves were opposite, the subsequent ones being arranged spirally.

The specimens match closely in their vegetative characters, which are aberrant for the genus in several respects. The leaves are palmately trinerved at the base, usually with a strong development of the basal tertiary veins, and the petiole is frequently geniculate at the junction with the lamina. The margin is crenate-dentate, with evenly spaced patches of glandular tissue lying at the end of short nerves running out to the edge of the leaf. These patches are present in addition to the glandular hairs with unicellular heads that are characteristic of subg. *Pseudojaca*. The leaves have a superficial resemblance to some members of the Tiliaceae, and Miquel described another collection as *Grewia subcordata*, which was reduced to *Artocarpus altissimus* by Burret in 1926.

The inflorescence characters are, nevertheless, those of *Artocarpus*, although the long-exserted, deeply bifid styles are again unusual, at least for subg. *Pseudojaca*. The tree is deciduous and the inflorescences are borne on short-shoots before the new flush of leaves appears. Smith, however, shows a young leaf with a crenate margin attached to the shoot-bearing inflorescences. These shoots are entirely leafless on the Heyne collection, but very young leaves dissected from the buds appear to show the glandular margin, while the twigs and buds agree with those of leafy shoots.

This species thus appears to be correctly described and referred to *Artocarpus*. In the more or less distichous arrangement of the leaves on the ultimate twigs, and the nonamplexicaul stipules, as well as in the size and shape of the inflorescences and the completely divided male perianth, *A. altissimus* agrees with subg. *Pseudojaca*. However, there is no obvious affinity with any other members of the subgenus and, in view of the very aberrant vegetative characters, the species is assigned to a separate section *Glandulifolium*.

SPECIES EXCLUDENDAE [5]

ARTOCARPUS (?) AFRICANA Sim, For. Fl. Port. E. Africa, 102. *t. 32*. 1919 (holotype, Mozambique, *Sim 5999* (PRE, not seen)) = **Treculia** cf. **africana** Dcne ex Tréc. Ann. Sci. Nat. Bot. III. 8: 109. 1847.

[5] The concluding portion of this paper refers to the genus *Artocarpus* as a whole, i.e., to this and the preceding paper, Studies in *Artocarpus* and allied genera, III. A revision of *Artocarpus* subgenus *Artocarpus*. Jour. Arnold Arb. **40**: 113–155, 298–368. 1959.

ARTOCARPUS BRACTEATA King in Hook. f. Fl. Brit. Ind. **5:** 540. 1888; King, Ann. Bot. Gard. Calcutta, **2:** 7. *t. 1B*. 1889 = **Parartocarpus bracteatus** (King) Becc.

ARTOCARPUS CANARANA Miq. Verh. Ned. Inst. III. **5:** 20. 1852 (holotype, Kanara, near Mangalore, *Hohenacker 796a* [leg. *Metz*] (U); isotypes (C, K, L, P)) = **Hopea wightiana** Wall. ex Wight & Arn. Prodr. 85. 1834. Metz' collection bears echinate insect galls that were mistaken by Miquel for the male inflorescences of *Artocarpus*. In describing this specimen as *A. canarana* he erroneously suggested that it might be the same as *A. lanceifolius* Roxb. (a species of western Malaysia described from Penang). The latter determination appeared on the herbarium labels and Thiselton Dyer, who cited the collection correctly under *Hopea wightiana* in the "Flora of British India" (**1:** 309. 1874), quoted only this identification, on Miquel's authority, without mention of *A. canarana*. This is the origin of the statement by Watt (Dict. Econ. Prod. India **4:** 273. 1890), followed by Cooke (Fl. Bombay **1:** 86. 1903), that Roxburgh had described the galls of *Hopea wightiana* under the name *Artocarpus lanceifolius*. The same galls were the basis of the name *A. ponga* Dennst., and they are commented on further below.

ARTOCARPUS CANNONI W. Bull in T. Moore, Florist & Pomol. **1875:** 210. 1875; Van Houtte, Fl. Serres **21:** 131. *tab*. 1875 = **Ficus cannonii** (W. Bull) N. E. Brown, Gard. Chron. III. **3:** 9. 1888, "*canoni*"; Solereder, Bull. Herb. Boiss. II. **3:** 515. *t. 3*. 1903. See below under *Artocarpus laciniata* Veitch.

ARTOCARPUS CERIFERA Miq. Ann. Mus. Lugd.-Bat. **3:** 212. 1867 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc.

ARTOCARPUS ELONGATA Miq. Fl. Ind. Bat. Suppl. 419. 1861, Ann. Mus. Lugd.-Bat. **3:** 213. 1867 (holotype, Sumatra, Sibolga, *Teysmann HB 767*) = **Sloetia elongata** (Miq.) Koord. Exkursionsfl. Java **2:** 90. 1912.

ARTOCARPUS EXSCULPTA W. Bull, Gard. Chron. II. **10:** 84. *t. 11*. 1878 (*Ficus exsculpta* in ind.) = **Ficus exsculpta** W. Bull, Cat. no. 154, 5. *t. 1*. 1879. This species was mentioned briefly in the Gardeners' Chronicle of 1878 as having been exhibited recently by W. Bull at Preston under the provisional name of *Artocarpus exsculpta*. The figure given of a sterile shoot closely resembles the plate of a fertile shoot of *Ficus exsculpta*, which appeared as new introduction from the South Sea Islands in Bull's Catalogue for 1879. The latter was also stated to have been exhibited at Preston, and the names may be assumed to refer to the same plant. This is supported by the apparent correction in the index of the Gardeners' Chronicle.

ARTOCARPUS FORBESII King in Hook. f. Fl. Brit. Ind. **5:** 539. 1888; King, Ann. Bot. Gard. Calcutta **2:** 7. *t. 1A*. 1889 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc. ssp. **forbesii** (King) Jarrett.[6]

ARTOCARPUS FRUTESCENS Renner, Bot. Jahrb. **39:** 367. 1907 = **Prainea frutescens** Becc.

ARTOCARPUS INVOLUCRATA K. Schum. in Schum. & Hollr. Fl. Kais. Wilhelmsland, 39. 1889 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc.

ARTOCARPUS LACINIATA Veitch, Gard. Chron. II. **4:** 159. 1875; Solereder, Bull. Herb. Boiss. II. **3:** 515. *t. 3*. 1903 = **Ficus cannonii** (W. Bull) N. E. Brown,

[6] This footnote is to draw attention to the new combination which it is necessary to make here: **Parartocarpus venenosus** (Zoll. & Mor.) Becc. ssp. **forbesii** (King) Jarrett, comb. et stat. nov.; basionym *Artocarpus forbesii* King, Ann. Bot. Gard. Calcutta **2:** 7. *t. 1A*. 1889.

Gard. Chron. III. 3: 9. 1888. Both *Artocarpus laciniata* and *A. cannoni* were introduced as seedlings from the Society Islands. They were valued for their dissected, brightly coloured leaves and the two species were based on differences in these. On flowering both proved to be figs and Solereder, who studied them in some detail, showed that they were conspecific, agreeing in characters of the fig and of leaf anatomy. The dissected leaves were juvenile forms, whereas the adult leaves were entire. Solereder considered that the differences in leaf colour between the two species and a variety of *A. laciniata*, described by Veitch as *A. laciniata metallica*, might be due to cultural conditions.

ARTOCARPUS LIMPATO Miq. Fl. Ind. Bat. Suppl. 421. 1861 = **Prainea limpato** (Miq.) Beumée ex Heyne.

ARTOCARPUS PAPUANUS Renner, Bot. Jahrb. **39:** 367. 1907 = **Prainea papuana** Becc.

ARTOCARPUS PONGA Dennst. Schlüssel Hort. Ind. Mal. 30. 1818, nomen illegitimum; Hassk. Hort. Mal. Rheed. Clav. 34. 1867 = **Hopea wightiana** Wall. ex Wight & Arn. Prodr. 85. 1834. This species is based on Rheede's *Ponga* (Hort. Ind. Malab. **4:** 73. *t. 35*, 1683, as *Pongu* on the plate); I am indebted to the late A. H. G. Alston for its identification. Echinate galls bearing a superficial resemblance to the inflorescences of some species of *Artocarpus* frequently occur in *Hopea wightiana* and were shown in the illustrations of Wight (Ill. Ind. Bot. *t. 37*. 1840) and Beddome (Fl. Sylvat. *t. 96*. 1871). The appearance of these galls, and also of the leaves, agrees well with Rheede's picture, and the galls, which are formed from terminal or axillary buds, sometimes occur in clusters, as shown there. Rheede described these structures as calices containing several seeds, which were presumably the pupae of the insects. Brandis (Ind. Trees, 68. 1906) records *ila pongu* as a Tamil name for *Hopea wightiana*. No precise determination for *Ponga* appears to have been published previously, although the suggestion that it might be a species of *Broussonetia* was made by Hamilton in a key to the "Hortus Malabaricus" (Jour. Linn. Soc. **17:** 195. 1835). *Artocarpus ponga* antedates *Hopea wightiana*, but this will not necessitate any nomenclatural change, since Dennstedt's name was based on a monstrosity (Int. Code, Art. 67. 1956).

ARTOCARPUS RIEDELII Miq. Ann. Mus. Lugd.-Bat. **3:** 213. 1867 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc.

ARTOCARPUS SCANDENS Renner, Bot. Jahrb. **39:** 367. 1907 = **Prainea scandens** King.

ARTOCARPUS TYLOPHYLLA Miq. Fl. Ind. Bat. **1**(2): 289. 1859 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc.

ARTOCARPUS VENENOSA Zoll. & Mor. Natur- en Geneesk. Arch. Ned.-Ind. **2:** 213. 1845 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc.

ARTOCARPUS VENENOSA Zoll. & Mor. var. TYLOPHYLLA Miq. in Zoll. Syst. Verz. Ind. Archip. **2:** 89, 95. 1854 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc.

ARTOCARPUS WOODII Merr. Philip. Jour. Sci. Bot. **3:** 221. 1908 = **Parartocarpus venenosus** (Zoll. & Mor.) Becc.

ARTOCARPUS sp., Merr. Pl. Elmer. Born. 46. 1929 (*Elmer 20978*) = **Aporosa nitida** Merr. l.c. 143.

Two nomina nuda are also to be excluded from the genus.

ARTOCARPUS BIFARIA Wall. ex Miq. Ann. Mus. Lugd.-Bat. 3: 213. 1867, pro syn. *Sloetia sideroxylon* Teysm. & Binnend. ex Kurz, Jour. Linn. Soc. Bot. 8: 167. 1864, nomen superfluum = **Sloetia elongata** (Miq.) Koord. Exkursionsfl. Java 2: 90. 1912.

ARTOCARPUS ? ? FINLAYSONIANA Wall. Cat. no. 4662. 1831, nomen nudum = **Sloetia elongata** (Miq.) Koord. The two collections that were cited by Wallich under this number consist, in his herbarium at Kew, of specimens of *Sloetia elongata*. *Wallich 4662A* was collected by Finlayson and has abnormal, much branched inflorescences. Under the number *4662B* there are two sheets collected from a plant in the Calcutta Botanic Garden which had been introduced from Penang. One bears a shoot with normal inflorescences. The other bears a single leaf and a label with the determination in Wallich's hand "*Morus ? ? bifaria* Wall." This suggests that the source of the name *Artocarpus bifaria* Wall. mentioned above is another sheet of this collection which had been assigned to the latter genus.

NOMINA DUBIA

ARTOCARPUS DIMORPHOPHYLLA Miq. var. MACROPHYLLA Miq. Fl. Ind. Bat. Suppl. 417. 1861. No specimens bearing this determination have been seen and the description is not identifiable.

ARTOCARPUS LAMELLOSA Blanco, Fl. Filip. 667. 1837, ed. 2. 465. 1847, ed. 3. 3: 74. 1880; Ahern, Timber Tree Sp. Philip. 35. 1901, excl. tab. The reasons for treating *A. lamellosa* as a *nomen dubium* are discussed above, under *A. nitidus* ssp. *nitidus*, which Merrill erroneously reduced to Blanco's species in 1905 (Publ. Gov. Lab. Manila 27: 80).

ARTOCARPUS PARVIFOLIA Voigt, Syll. Ratisb. 2: 53. 1828. The brief description of trilobed leaves, drawn up from a cultivated specimen from the garden of Belvedere, Thuringia, is not identifiable.

ARTOCARPUS RETICULATA Hunter ex Ridley, Jour. Str. Br. Asiat. Soc. 53: 114. 1909. Ridley thought that *A. reticulata* was probably referable to *A. lanceifolius*, and this seems likely, but the description is inadequate for identification.

ARTOCARPUS ROTUNDA (Houtt.) Panzer in Panzer & Christmann, Pflanzensyst. 10: 380. 1783; Merr. Jour. Arnold Arb. 19: 331. 1938. Merrill identified this plant with *Artocarpus rigidus* and it has been discussed under that species (Jour. Arnold Arb. 40: 153. 1959).

RADEMACHIA ROTUNDA Houtt. Nat. Hist. II. Pl. 11: 455. 1779. This is the basionym of *Artocarpus rotunda* (Houtt.) Panzer.

NOMINA NUDA [7]

ARTOCARPUS ANGUSTIFOLIA Roxb. Hort. Beng. 66. 1814.

ARTOCARPUS BLUMEI Tréc. var. SARAWAKENSIS Boerl. Handl. Fl. Ned. Ind. 3: 370. 1900; Merr. Bibl. Enum. Born. Pl. 218. 1921.

ARTOCARPUS (?) FOENIFORMIS Eeden, Houtsoort. Ned. Oost.-Ind. 122. 1886, ed. 2. 242. 1905.

ARTOCARPUS MADAGASCARIENSIS Bojer, Hort. Maurit. 290. 1837.

[7] The following list of names, published without description and of undetermined application, is appended for the sake of completeness.

ARTOCARPUS NEO-CALEDONICA Linden, Cat. 52. 1871; Guillaumin, Bull. Soc. Bot. Fr. **90:** 35. 1943.

ARTOCARPUS OVATUS Noronha, Verh. Batavia. Genoot **5**(5): 7. 1790. Noronha gives the Javanese name for this species as *riandelica* and this may be an error for *mandelica*, a name which is recorded for *Artocarpus rigidus*.

THE ARNOLD ARBORETUM,
HARVARD UNIVERSITY

Present Address: ROYAL BOTANIC GARDENS,
KEW, ENGLAND